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ECONOMIC CONSIDERATIONS FOR INFERTILITY:

THIRD PARTY COVERAGE OF INFERTILITY TREATMENT

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Task II: Third Party Coverage of Infertility Treatment

I. Introduction

The contractor is to analyze the cost of infertility diagnosis and treatment to 1) insurance companies, 2) alternative health-care providers such as Health Maintenance Organizations (HMOs), and 3) other third party reimbursers such as government medical benefits programs (i.e., Medicaid for disabled or low income individuals). The analysis is to be based on a survey of any published materials and a personal survey of these third party organizations.

The contractor is to assess the current level of third party reimbursement for infertility service, concentrating on non in vitro fertilization expenditures, such as diagnosis, treatments and gamete and embryo banking.

The analysis shall include: a) estimates of costs to third party organizations, at the present level of coverage, of infertility related treatment based on estimates of the number of insurance companies, alternative health care providers and governmental programs currently providing coverage and the extent of that coverage; b) the projected costs of this treatment to

each of the third party payer groups in 5, 10, and 20 years at the present level of coverage and assuming the infertility level continues according to current national statistics; c) the immediate and projected future costs , at 5, 10 and 20 years, to the third party providers if all aspects of infertility diagnosis and treatment were covered and the level of infertility stayed constant; d) the projected future costs, at 5, 10 and 20 years, to third party providers if the incidence of infertility increased or decreased; and e) the consequences of these various levels of coverage and infertility costs on health insurance premiums, membership fees, and out-of-pocket expenditures. Finally, the contractor is to discuss the costs that may be incurred by employers of individuals having infertility problems, such as loss of time on the job, health care benefits, and others.

Some basic assumptions and definitions must be stated at the outset:

1. The definition of infertility will be the same as that used elsewhere in the OTA study, as couples where "neither partner is surgically sterile, a couple is classified as infertile if, during the preceding 12 months or longer, they were continuously married, presumed to be sexually active, had not used contraceptives, and had not conceived."

2. In making cost projections, expenditures will be augmented (compounded) by 10 percent each year (unless otherwise indicated) to reflect changes in the cost of medical care and in the incidence of infertility diagnosis and treatment. This is the same inflator used by the OTA elsewhere in its study. (OTA May 1987 draft, p. 10-16)

3. Expenditures will be reduced to a cost per couple basis in order to facilitate reflection of projected population changes and their effect on total expenditures for infertility services.

4. Our projection of the population change over the relevant 20 year period, starting in 1987, and the estimated number of infertile couples, is shown in Table II-1.

In developing Table II-1, we have accepted the fairly standard premise that women between the ages of 15-45 represent the primary market for infertility services. We have used the conservative "Middle Series" of census projections, and, since our projections are only for a maximum period of 20 years, most of the target population has already been born. Because our definition of infertility is based on "couples", we have reduced

the total female population in the desired age range to the number assumed to be married, and have then reduced that to the 8.5 percent of married women who are assumed to be infertile. We have not separately accounted for male infertility, which may be the primary problem in a substantial number of couples, on the premise that in most situations, either the male and female would seek treatment simultaneously, or the women would be the first to be examined. Thus, we feel that, under our definition, the number of infertile married women is the best proxy for "infertile couples." This number, then, is further subdivided into the 30 percent who are presumed to suffer from primary, and the 70 percent who have secondary infertility. This is a needed step, since existing data show that these two subgroups seek infertility services at dramatically different levels, i.e., 51.2 percent and 22.45 percent, respectively. Finally, we arrive at the number of infertile women (couples) for the present base year, 1987, and the 5, 10 and 20 year intervals required. Our sources are documented in the notes to Table II-1, and they are all taken from references that have previously been relied upon in the OTA draft report of May, 1987.

It is recognized at the outset that some of the assumptions that are stipulated in the contract, as well as others that will

be spelled out in the course of the analysis, will be controversial and subject to challenge. This must be true for several reasons. As has been reported in earlier studies provided to us by the OTA (19, 23, 25) and as is generally known, insurance coverage is highly plan-specific. There does not exist any central pool of data which specifically reports on overall coverage of or experience with infertility services by the various third party payment organizatons, though there are indications that coverage may be quite widespread for many basic services. (OTA May 1987 draft, Tables 10-6, 10-7 and 10-8)

At the same time, technology is changing rapidly, as is the structure of third party reimbursement in general, and both of these trends can evoke a variety of responses. In the case of technology, for example, in vitro fertilization (IVF), which was initially introduced to the U.S. in 1981, is still considered to be "experimental" and, therefore, not insurable by many third party payers. At the same time, however, a substantial number of carriers provide largely "routine" coverage for IVF, a rather remarkable development in such a short time period. In at least one state, Maryland, some coverage is mandated. (Similar bills are pending elsewhere.)

With respect to the structure of third party reimbursement, there has been a dramatic shift away from "traditional" group health insurance (Blue Cross/Blue Shield (BC/BS) and commercial), which accounted for roughly 95 percent of the total as recently as 1980, to forecasts that it may account for as little as 5 percent by 1990. Much of the shift will be to HMOs and Preferred Provider Organizations (PPOs), the latter of which did not even exist in 1980. As much as 25 percent of the total by 1990 may be under "managed care" plans, which are also a creature of the 1980s. A sizable proportion of both managed care and PPO plans will be self insured by employers. (1) Such plans, currently, are virtually free of regulation and have no reporting responsibilities, save to the U.S. Labor Department on ERISA Form 5500 (for employers with 100 or more employees). At present, no public summary exists on the totals of these reports. Self insured plans that meet ERISA's non-discriminatory requirements, furthermore, are currently exempt from state insurance regulation.

Given the fact that "cost containment" has been the dominant theme of both health insurers and employers during the 1980s, there is reason to believe that many group health plans may have chosen to restrict coverage for certain "fringe" services, of

which infertility treatment is certainly an example. Since many in our society still harbor a variety of moral and ethical concerns in reference to infertility services, restrictions based on the source of eggs and semen, i.e., to spouse versus other donors, will undoubtedly continue to appear in some plans for years to come. Other options, such as use of surrogate mothers, are not covered by any plan at present and continue to be plagued by a very murky and uncertain legal status.

These and other factors, which will be explored in more detail below, all contribute to the uncertainty of long term projections.

This report on third party coverage of infertility treatment is in several sections. Section II deals with the costs to third party organizations of infertility related treatment at present levels of coverage. Section III projects those costs 5, 10, and 20 years into the future, assuming continued coverage at current levels and no change in the level of infertility.

In Section IV, the immediate and future costs to third parties if <u>all</u> infertility related services were covered will be estimated. Section V will make similar projections based on

higher/lower estimates of infertility, while Section VI will assess the consequences of these various levels of infertility coverage and costs on premiums and out of pocket payments. Section VII will discuss other costs that may be incurred by employers of those with infertility problems, and Section VIII contains some brief caveats and conclusions.

II. Costs to Third Parties of Infertility Related Treatment at Present Coverage Levels

a. Expenditures for Infertility Services

The OTA has, based on earlier studies, estimated total expenditures for infertility at $935 million in 1986, with $ 8 5 million of that total going to IVF expenditures (OTA draft, May 1987, p. 10-16). Using the census sources and procedures cited in Table II-1, it was determined that there were 782,000 infertile couples in 1986, which means that the average cost of services per infertile couple was $1,196.

Absent a compelling reason for doing otherwise, we chose to adopt OTA's 10 percent per year cost inflator to determine expenditures for our base year, 1987, and for the projected years of 1992, 1997, and 2007. (See OTA draft, May 1987, p. 10-14 through p. 10-16) The results are presented in Table II-2. Column 1 projects total costs for all infertility treatments including IVF (by infertile couple and by infertile population) at a constant 10 percent inflation rate from 1987 through 2007. Column 2 does the same thing, omitting IVF expenditures. In

Column 3, we project a variable inflation rate for IVF expenditures. It is a very new technology, and there is reason to believe that its use will expand more rapidly in the short run than the use of other infertility services as knowledge of the procedure, the supply of services and the spread of third party coverage all increase. Thus, we have illustrated the results of a 20 percent per year inflation of IVF expenditures through 1992, reducing to 15 percent per year from 1993-1997, and finally falling back to the same 10 percent inflation that has been assumed for all other services from 1998-2007. Column 4 simply totals Column 2 and 3.

It is obvious from the above that some simplifying assumptions are also inherent in our projections. For example, no attempt has been made to break out the expenditures for specific services on the basis of what percentage of infertile couples use each such service. It should be clear that not all infertile couples use IVF, but we have, nevertheless, averaged the projected expenditures for those services over all the infertile couples. Our rationale for doing so is straightforward. Firstly, the greater detail is not required to fulfill the requirements of Task II, which focus primarily on

aggregate costs to various third parties, not specific costs to couples. Secondly, given the heroic assumptions already inherent in these projections (e.g., population, infertility rates, inflation rates, marriage rates, etc.), further efforts to specify details would only project a false image of precision. Thirdly, it is assumed that the projected growth in IVF expenditures are net of any substitution of IVF for other infertility treatments.

b. Third Party Payers--Structure

Before proceeding with our estimates of the costs to third parties of infertility related treatments at present levels of coverage, it is appropriate to report on the results of our telephone survey of third party payer organizations.

The first task assigned included a request to estimate "the number of insurance companies, alternative health care providers, and governmental programs presently providing coverage and the extent of this coverage." Initially, contact was made with the Health Insurance Association of America (HIAA), the leading trade association of commercial health insurance companies in the U.S.

It regularly publishes a Source Book of Health Insurance Data (the latest for 1984-1985), with annual updates (latest for 1986) in years when the full document is not prepared. While this publication provides a wealth of health insurance and other health related statistics, and is a widely cited reference, it does not list the number of insurers currently operating in the country nor any other company-specific data regarding coverage or loss experience. Nevertheless, HIAA was able to report that it has a membership of 340 companies, which are estimated to account for between 75 and 80 percent of all commercially insured health benefits in the U.S. Note that HIAA reports that some of their member companies write only individual medical expense benefits, some only group contracts, and some handle both. A few may write neither, concentrating instead, on income replacement coverage for illness or disability. The number of companies in each category are not tabulated at this time for member or non-member companies. HIAA estimates that about 860 non-member insurers are also licensed to sell health insurance, for a total of about 1,200 commercial companies.(20)

As of July, 1987, there were 79 BC/BS plans operating in the country (6). Once again, there are no data available to identify specific coverage options by plan or the number of persons covered. Like commercial insurers, each BC/BS plan has a wide range of individual and commercial (group) subscribers, and, especially with regard to the latter, covered benefits are often tailored to the individual specifications of the buyer -- usually the employer. The details of coverage, then, may depend on anything from the whim of a particular business leader to a lengthy negotiation between employer and union. Furthermore, some BC/BS plans have converted to either stock or mutual insurance company status in recent years for a variety of reasons. It is possible, then, that some minor double-counting may exist among these carriers.

Even more confusing, potentially, is the patchwork network of multiple option coverage that has emerged in recent years. HMOs have actually been around for perhaps 50 years, though the HMO designation emerged only in 1969. As of December 1986, there were 626 HMOs operating in the U.S., with total enrollment approaching 26 million.(9) Most of the growth in both the number of plans and the number of enrollees has taken place since 1980, and even in that period, there have been important shifts in the

rate of growth by type of HMO, i.e., group, staff or independent practice plan.

While HMOs have been clearly defined by legislation, there is nevertheless, considerable variation among them based on whether or not they are federally qualified. There is also significant variation in both the specific services that are covered and the way in which the "philosophy of coverage" is implemented. All HMOs operate on the "gatekeeper" basis of requiring the member to go through a primary care physician in order to qualify for "necessary" specialized services. Not only can the interpretation of "necessary" vary among primary care providers, but so can the definition of what services are "experimental", and thus not eligible for inclusion. This latter point would usually reflect a plan-wide policy, but in at least some cases the decision may reside with the individual primary care provider.

PPOs are relative newcomers to the health plan scene, having orginated in California in about 1982, but they have had a significant impact. Available data about them are sketchy and conflicting. According to one source, there were 674 operational PPOs as of April 1987. (18) However, a competing source reported

that as of June 1, 1987 there were 535 operational PPOs nationwide, with an additional 35 in the immediately pre-operational stage and 189 more that plan to begin operations as soon as 1988, for a total of 759. (20) Since both organizations are of recent origin, the contractors are unable to assess their reliability with confidence. Between 35 and 38 million persons are said to have a PPO option available to them at this time, but exact figures on the number who have exercised that option are not available. PPOs take a variety of forms. It has been said that, "if you have seen one PPO, you have seen one PPO," an indication that the varieties are virtually endless. This continues to be true, at least in part, because PPOs generally lack the clarity of statutory definition that was conferred on HMOs by Congress and most states during the 1970s. While a few states have initiated some regulatory constraints in the last couple of years, these are usually limited to "risk bearing" PPOs, which make up only a small portion of the total.

The essential elements of a PPO are usually some form of contractual arrangement between insureds and providers that provide for guaranteed prices (charges) for specific services, often at a discount, some form of utilization review, and incentives for covered workers to use the preferred service

provider(s). These incentives generally take the form of reduced or eliminated deductibles or co-insurance arrangements. PPOs usually operate in conjunction with an existing benefit plan which may be commercially insured, covered by BC/BS, self insured, or some combination of the above. It is not unusual, for example, for a PPO to be offered in conjunction with a group plan which uses BC/BS for basic benefits and a commerical insurer for major medical. This clearly creates a potential for double counting and confusion. There are also some completely independent "risk bearing" PPOs, as mentioned above. Sponsorship of PPOs can be by care providers, insurers, employer(s) or independent entrepreneurs.

A large and rapidly growing number of employee benefit plans are also self-insured by employers, but, as has been noted, no detailed data that are of direct value to the present study are available. There were, in 1986, reported to be 2.34 million organizations in the U.S. with health care plans, and 176,424 of those (8 percent) wre reported to be self funded. (12,16) It has been stated that, "Even though only 8 percent of all employment related health plans are self insured, over 50 percent of all employees with health insurance participate in these self insured plans." (16) Again, however, these numbers may be somewhat

misleading, since little is known about the exact coverage under these self insured plans, and there may be considerable duplication involved. Many employers, for example, have partially self insured programs, i.e., for some benefits such as dental or vision services, while the remainder may be insured more traditionally.

A somewhat more sophisticated estimate regarding the extent of self insurance has been made by the Employee Benefits Research Institute, which is one of only three organizations that has been regularly analyzing data tapes of the Bureau of Labor Statistics. They have estimated that the present labor force is divided roughly half and half between the sum of medium and large size firms, on one hand, and the smaller firms on the other. Their analysis has estimated that 42 percent of health plan participants in the medium /large firms were self insured in 1986, while only one-third of of those in smaller firms were. Based on this, they estimate that abut 25 percent of the workforce is covered by self insurance benefits. They have also more rigorously defined self insurance to include only plans that encompass hospital benefits. (4)

It has become common, today, for larger employers to offer so-called "triple option" benefit plans to their employees. These options usually include a "traditional" insurance plan with a commercial or BC/BS plan, an HMO, and a PPO which is based on the traditional plan. In fact, many insurers will themselves offer all three options, as in the case of Blue Cross of Greater Philadelphia, which offers its normal BC service contract, operates its "Personal Choice" plan as a PPO, and recently purchased the Delaware Valley HMO in order to provide an HMO option. In the commercial insurance arena, Prudential maintains its traditional health benefits coverage through the parent company and has created separate (subsidiary) corporations to offer HMO and PPO options. In the case of the Equitable Life Insurance Company, a separate subsidiary, Equicorp, now offers all three health options.

"Managed care" has become the latest major development in health benefits. This label encompasses, again, a variety of arrangements which may fall under most of the other headings discussed, but which build in fairly aggressive utilization controls, such as preauthorizations, limitations on coverage of in-hospital procedures, and employee health education programs.

Many self insured and "managed care" programs are operated by third party administrators (TPAs), who do not have any insurance risk, but simply administer existing programs for employers, union groups and others. Once again, responding to the changing marketplace, many commercial insurance companies now serve exclusively as the TPA for former insurance accounts as well as for new customers under "administrative services only" (ASO) contracts in which they have been no insurance risk at all but simply sell their administrative and claims handling expertise for a negotiated fee. This further confounds the data, since HIAA includes self insured plans that are administered by insurance companies under ASO contracts in its totals for "insured plans". (20)

Finally, it should be noted that recent dramatic changes in the structure of American industry, including the decline of so-called "smokestack" industries such as automobiles and steel, which traditionally had the most generous health care benefits, combined with dramatic increases in the absolute size of the workforce, means that an increasing proportion of the workforce is now employed in smaller firms. These are a less likely to

have either the administrative or financial resources to enable them to afford self insurance, so the trend of recent years in this regard might well be reversed in the future. Note, however, that changes in tax law and state insurance regulation are often the primary motivation for firms to self insure. Firms that provide employee benefits that meet all of the non-discriminatory and other provisions of the Employee Retirement Income Security Act (ERISA) are shielded from state insurance regulation by the "deemer" clause, Section 514 b 2b of ERISA, which states that such plans "shall (not) be deemed to be an insurance company."

c. Third Party Payers - Current Coverage of Infertility Services

The contractor's limited telephone survey of third party organizations produced results that, in large measure, are consistent with information reported previously by the OTA. (See, in particular, OTA May 1987 draft, pp. 10-13 through 10-24). However, some minor discrepancies were found. Both HIAA (20) and National BC/BS (24) stated that they neither had nor knew of any national data source for such benefit-specific information, emphasizing again that most variations in group health insurance benefits are highly plan specific. That is,

once the benefits go beyond the fairly standard package of hospital, surgical and medical services, with or without major medical or comprehensive provisions, the insurer will normally be willing to "tailor" provisions to the tastes of the buyer. This tailoring may apply, e.g., to combinations of deductibles and copayments, specific exclusions, and special additions to normal coverage. The most important variable here is typically the availability of premium dollars, since most group plans are experience rated. Nevertheless, insurers may temper the demand for new coverages by quoting very high (i.e., conservative) provisional/projected premiums, in the absence of previous experience.

While neither trade association had either cost or coverage data relating to the overall use of infertility services, both had some interesting comments regarding IVF. In the case of National BC/BS, work is currently in progress on the development of an optional "model benefit" for IVF which member plans could offer on request. (24) Work has focused, to date, on clinical (identifying services) and contractual (legal language), aspects and there is no intention of getting into pricing issues, which are always left to the individual plans. Work on this model benefit was apparently initiated in response to the mandating of

IVF services by the state of Maryland, in 1985. (OTA May 1987 draft, p. 10-19 and 10-20) Not surprisingly, the "prototype" clause being developed incorporates much of the language used by Maryland BC/BS, including most of the constraints of the Maryland law (e.g., 5 years seeking infertility treatment, prior use of all non-IVF treatments and artificial insemination by husband only), while differing by suggesting that the clause be offered as an option rather than as a mandatory benefit. (10,22,24)

HIAA, though it had no general data on infertility, did, coincidently, have the results of a recent (Spring, 1987) survey conducted at the request of its Public Relations Department on the availability of IVF coverage. The study, based on a 100 percent sample of their 20 largest companies plus a random sample of 80 other members, produced rather surprising results. It found that while large companies were more likely to provide IVF benefits than small companies, there was little difference between coverage in group versus individual policies. On a weighted basis, it was estimated that 41 percent of those covered under group policies and 40 percent of those covered by individual policies currently have coverage for at least most of the services associated with IVF, though a variety of

restrictions exist, particularly with respect to the source of egg and sperm. These figures are based on a question which referred to "typical" group and individual policies.

In a follow up question, virtually all of the large and none of the small insurers who did not provide for IVF in their most typical policy did make the option available under other policies upon request for the benefit by the policyholder. The most common reason for not covering IVF under both group and individual contracts was that "it is not the treatment of an illness." The next most common reason given was that "it is still an experimental treatment." Claims evaluation is done on a case-by-case basis, with no standard practice identified by most carriers. (20) These survey results tend to moderate, though not necessarily contradict, OTA's statement that "the majority of all health insurance plans and HMOs specifically exclude coverage for IVF." (OTA May 1987 draft, p. 10-18 and 10-19)

The contractors were informed that the Prudential recognizes infertility as an illness, and it routinely covers virtually all related services, including artificial insemination (restricted to only husband and wife--no donors or surrogates) and IVF, so

long as the services conform to standards established by the American College of Obstetrics and Gynecology and are determined to be medically necessary. Drugs, such as clomid and pergonal, are covered, dependent on the plan (i.e., is there drug coverage for other purposes?). Deductibles, copays and out of the pocket limits are the same for IVF as for all other covered services. (28)

Officers of BC/BS plans were queried in Delaware, Maryland, Massachusetts and Philadelphia regarding their infertility coverages. In Delaware, most infertility services can now be covered, since BC/BS voluntarily introduced optional IVF coverage in early 1987. Basic drug and surgical treatments already had been covered by the standard contract. The introduction of the optional IVF provision was the direct result of a nearly successful effort in the state legislature to mandate the benefit. At present, there are no mandated benefits in Delaware, and BC/BS wanted to keep it that way. By acting promptly, BC/BS was able to incorporate limiting provisions that it desired, including a lifetime limit of $25,000 for IVF which applies even if the infertile couple changes to another employer's plan or transfers to the BC/BS sponsored HMO. It also imposes a lifetime limit of $600 on artificial insemination, though it will cover

donor or spousal sperm. Like Maryland , it requires that all other options must have been exhausted before IVF is covered, but it does not stipulate that the couple must have been seeking services for five years. Surgical procedures, including tubal reconstruction, are covered if medically necessary, but not simply to reverse previous contraceptive sterilization. Incidentially, Delaware BC/BS routinely covers surgical sterilization without medical necessity, on request. (15)

At present, the IVF benefit is too new to have generated any viable experience, but BC/BS has scheduled a promotional mailing for August, 1987. They have already had DuPont, one of their larger accounts, adopt the benefit for implementation in January, 1988. State employees have been covered since January, 1987.

In Maryland, the only state so far that has mandated coverage (not just availability of coverage) for IVF, the law has been in effect for two years, but neither the Insurance Division of the State Department of Licensing and Regulation, nor the statewide Blue Cross plan have yet compiled any meaningful loss statistics. (10,22) While the Maryland law has a number of provisions (e.g., 5 year history of infertility, exhaustion of

all other insured options, spousal sperm only,...) designed to limit cost, it does not allow any other restrictions such as the lifetime dollar limits used in Delaware or limits on the number of cycles of IVF treatments. Interestingly, the law does not require coverage for artificial insemination, a treatment that normally precedes IVF, but BC added this to its policy to assure that this less costly procedure would be attempted before IVF. (10,17,22) The law's mandate only applies to outpatient IVF procedures and to policies that provide pregnancy-related benefits. While it applies to both group and individual policies, the wording appears to exempt HMOs from its mandate. (22)

A spokesperson for Maryland BC did state that the original estimates that were made in calculating start-up premiums for the mandated benefit seem to have been close to target, though the numbers of recorded preauthorizations for IVF, 650 from July 1, 1985 to July 1, 1987, are a little below projections. The reason offered for this was the temporary decline in the statewide supply of IVF services. As noted by OTA (OTA May 1987 draft, p. 10-21 through 10-22), where demand is unknown, but thought to exceed supply, and supply is known, it is reasonable

to project use estimates on supply alone. This is what BC did in Maryland. However, rather than expanding, the supply of IVF services contracted during the first two years of the program. Two of the three clinics operating when the law went into effect (Johns Hopkins and Union Memorial Hospitals) subsequently closed their clinics, though Union Memorial has since reopened. Greater Baltimore Medical Center, on the other hand, has expanded its capacity, though not enough to make up for the closures. As a result, BC has paid for a number of out of state treatments, though not as many in total as had been expected. (7, 10)

Aside from the mandated IVF benefit, the standard BC contracts in Maryland cover all other infertility services on the same basis as other medical procedures. If the group contract provides for diagnostic services (90 percent of their contracts do) or drug coverage (75 percent of basic contracts and 95 percent of major medical contracts do), they are covered in the same manner for infertility services as for any other. Similarly, the same rules apply for deductibles (usually $100-$200), co-insurance on major medical (normally 80 percent) and out of pocket limits on major medical. About half the policies have such a limit, usually in the $2,500 range. (10)

In Massachusetts, contrary to the statement in the OTA report (OTA May 1987 draft, p. 10-19) we found that there is no requirement to either provide coverage or to offer an IVF rider (26), though Massachusetts BC does have several infertility related riders available, with the principal one being for IVF. As a general rule, Massachusetts BC does not cover infertility services in its basic contracts because "they are not considered medically necessary." The IVF option that is available covers only outpatient services and restricts benefits to spousal eggs and sperm. BC offers no coverage of artificial insemination, but tubal surgery coverage is available. When the IVF option became available in Feburary 1986, all accounts were notified, but only a few large accounts have exercised the option, and no usable claims data are yet available. When IVF is an added coverage, it is subject to the same conditions as other benefits. Most accounts (90 percent) have no deductible, no co-insurance, and upper limits of $1 million. (13)

Ernest Lampron, like all other BC and insurance company representatives who were contacted, specifically noted, however, that even where no IVF or other infertility coverage exists or is intended, many, if not most, individual procedures can

individually "slip by the screens." As has been noted elsewhere, (19, 23) if claims for services are submitted by a physician as "medically necessary" and the word "infertility" does not specifically appear, coverage is more likely to result.

BC of Greater Philadelphia covers most of the basic infertility treatments including drug therapy, surgical procedures and artificial insemination (no restriction on donor) under its standard contract. Diagnostic services are covered if the contract includes them for all other conditions, except for ovulation kits and hampster tests (not considered foolproof). IVF, however, is not covered unless specifically requested by the insured group, because BC of Philadelphia still considers it to be a largely experimental procedure. Interestingly, though, they do cover IVF under their "Personal Choice" PPO plan which has been heavily promoted in recent months. It is assumed, therefore, that at some point, BC of Philadelphia will cover IVF as a standard procedure. (5)

Three different HMOs were also surveyed. Delaware Valley HMO, a wholly owned subsidiary of BC of Philadelphia since January 1987, covers "approved" infertility services as a

standard benefit, but imposes a 50 percent co-insurance on all physician's charges, including any related to surgery, whether inpatient or outpatient. "Approved" services are those authorized by the patient's primary physician. In the case of women, "dual primary physicians" - a general practitioner and an Ob-Gyn specialist - are available. If either refers the patient to an infertility specialist, coverage will apply at the 50 percent co-insurance rate. All drug therapy is covered in full under the regular prescription plan. Surgical and ultrasound procedures are covered, and the hospital portion of any related bill is covered at 100 percent (e.g., operating room, room and board). No benefits are provided for IVF. It was noted that the 50 percent copayment on infertility related physician services was instituted after a case where "a single infant cost us $40,000." (14)

HMO of Pennsylvania/U.S. Health Care, the largest independent practice organization (IPO) HMO in the country, also lets all women over 17 years of age select both a general practitioner and an Ob-Gyn specialist as their primary physicians. The Ob-Gyn specialist may refer to an infertility specialist for medically needed services. Coverage for

infertility includes benefits for consultation and treatment. Drugs administered orally are covered if the optional prescription drug plan has been elected, but "injectibles" (e.g., pergonal) are not covered. Various surgical procedures, including laparoscopy and tubal surgery, are covered with proper referral, and artificial insemination, with no restriction on source of sperm, is covered "as a last resort." There is no coverage available for IVF. (2)

HIP of New Jersey, a corporate relative of HIP of New York, does not cover either IVF procedures or reversals of surgical sterilization. All other infertility services, including drugs, are covered if the patient is referred by an HIP Ob-Gyn physician to an infertility specialist. The latter are compensated on a fee per case basis by HIP. Males, too, are covered. Penile implants, are restricted to the rigid, not the inflatable variety. More recent male infertility treatment, such as electro-ejaculation, are still considered experimental and are not covered.

The Region III office of the Health Care Financing Administration (HCFA), in Philadelphia, is responsible for Medicaid programs in Delaware, the District of Columbia,

Maryland, Pennsylvania, Virginia and West Virginia. Delaware, Pennsylvania, Virginia and West Virginia have similar policies regarding infertility. All will pay for drugs, counseling, and surgical procedures, including sterilization reversals if deemed medically necessary. None provide benefits for artificial insemination or IVF. Maryland Medicaid differs only in that it will not pay for surgical reversals of sterilization. The District of Columbia apparently has the most liberal medical coverage in the country. It reported that it covers all types of infertility services. Though it had not received any requests for IVF, if they do come, it would "probably pay them." (8) As with BC and commercial insurers, it is likely that some IVF component services are inadvertantly paid by most medicaid plans. This "leakage" is far less likely to occur under HMOs and "managed care" plans.

d. Current Cost to Third Parties

As the two previous sections have demonstrated, there is a diverse and rapidly changing mix of third party payment organizations, and there are no reliable data that adequately describe what they do. Further, the differences in stated

coverage provisions are dramatic even within the same type of third party organization, based on individual customer mix, (which reflects market demand), the availability of services in a given region, the insurers' perceptions of standard versus experimental treatment modalities, experience with existing coverage, and numerous other factors. In the face of all these uncertainties, any attempt to estimate current costs to third parties of infertility treatment on an disaggregated basis would be speculative at best. In the final analysis, our survey and other investigations have convinced us that the most viable basis for making an estimate at this time is to use the data presented by the OTA, which is based on the National Medical Care Utilization and Expenditure Survey (NMCUES) conducted in 1980 and extrapolated to this year. (OTA May 1987 draft, p. 10-16 and 10-17, and Table 10-8 on p. 10-50). While it is recognized that even this once authoritative source can be challenged, especially in light of the dramatic changes that have taken place in infertility technology, structure of the insurance industry and the nature of specific coverages since 1980, we take some comfort in the fact that the 71 percent proportion of total charges covered, as reported by OTA (OTA May 1987 draft, p. 10-16) is not much different than the level of coverage reported to us by the billing service for one of the larger IVF clinics in HCFA's Region III. (11)

Furthermore, while it would be nice to be able to disaggregate the total expenditures by all third parties for infertility services by type of insurer, available data make that task impossible. Unavailability of relevant age categories and marital status by type of insurer is the most obvious deficiency, aside from the previously discussed problems of definition, double counting and uneven mix of coverage within the same third party categories.

Based on this hypothesis, then, current costs to third party organizations of infertility services in the U.S. should be in the range of $735.6 million dollars, or 71 percent of the $1,036 million of total population expenditures that have been estimated for 1987, as shown in Table II-2, Column 1b.

Since IVF did not exist at the time of the NMCUES in 1980, and since it is clear that third party reimbursement is at a lower level for those services at this time, an alternative and presumably more accurate estimate can be offered to reflect some differential on this account. Inflating OTA's separate 1986 expenditure estimates for non-IVF infertility services ($850 million) and IVF services ($85 million) by the same 10 percent

which was discussed earlier, and adjusting for the population change, a total in 1987 of $941 million for the non-IVF services and $95 million for IVF services. Using the aforementioned 71 percent reimbursement for non-IVF services produces $668.1 million in insurance reimbursement. Again, relying on OTA estimates (OTA May 1987 draft, Table 10-5, p. 10-47), we hypothesize that 44 percent of the IVF expenditures, or $41.8 million are reimbursed by insurance. Under this set of assumptions, the total cost to third parties of all infertility services in 1987 would be $709.9 million, or $25.7 million less than if no adjustment is made for the IVF services. (See Table II-3) This seems to us to be the more reliable estimate.

III. Projected Cost to Third Parties for Infertility Services in 1992, 1997 and 2007, Assuming a Constant Level of Coverage and No Change in the Level of Infertility

The assumptions of constant levels of infertility and of insurance coverage for treatment are clearly unrealistic as bases for future predictions. We have seen, for example, that even IVF related services, none of which were explicitly covered at all until recently, because the procedures were considered experimental, have already, only 5 years after the initial introduction of IVF to the U.S., achieved coverage in many commercial contracts and by state mandate. The rate of coverage of 44 percent for component services in the fourth stage of the OTA scenario must rise -- probably quite sharply -- in the future. We already know of at least one state (Texas) that has passed a law requiring the availability of optional IVF coverage, effective January 1988. (17) Several other states have legislation pending that would either mandate or encourage broader benefits. Though the rise may not be completed in the next five years, there is every reason to expect that, with improvement in the technology and wider understanding and acceptance of the procedures, coverage levels for IVF will

eventually rise to match the rate of reimbursement for all other infertility services. This could happen in 10 years, but would very probably happen in 20 years. Indeed, even the overall rate of reimbursement for all other infertility services could rise above the current 71 percent level over time, eventually exceeding the 78 percent that is currently reimbursed for the hospital component of such services. (OTA May 1987 draft, Table 10-8, p. 10-50)

The assumption of a constant rate of infertility is somewhat more realistic, but is, nevertheless, at least subject to challenge. However, there is no current evidence of any dramatic trend in the rate of infertility.

For present purposes, we will also assume that all other relevant variables remain constant through the year 2007, including an assumed 10 percent per year inflation rate. Table II-4 illustrates the resulting figures.

In part A of Table II-4, we again assume that all infertiltiy expenditures are reimbursed at the uniform rate of 71 percent. Applying that rate to the projected expenditures (in millions of dollars) for the years 1992, 1997 and 2007, or $1,687, $2,706 and $6,832, respectively (as taken from Table II-

2, Column 1-b), yields expected aggregate costs to insurers of $1,198 million in 1992, $1,921 million in 1997, and $4,851 million in 2007.

In part B of Table II-4, we illustrate the results for the same years if we again compute insurance benefits at the differentiated rate of 71 percent for all non-IVF infertility services and 44 percent for IVF services. Naturally, this approach produces somewhat lower etimates of total costs to third parties. The results are: $1,156 million in 1992, $1,854 million in 1997 and $4,683 million in 2007.

Ironically, while we have argued that the assumption of a uniform reimbursement rate for all infertility services was not very realistic in our computations for 1987 (see Table II-3 and related discussion), it seems logical to assume that for longer term projections, especially at 10 and 20 years in the future, the assumption of uniformity is by far the more realistic of our assumptions. As stated previously, there are many valid reasons to assume that the rate of reimbursement for IVF services will increase sharply in coming years, ultimately achieving parity or near parity with all other infertility services in this regard.

As was noted in our earlier discussion of total expenditure estimates for infertility services over the next 20 years (see Table II-2 for the results), we feel that it is much more realistic to project a more rapid growth in IVF expenditures than in all other infertility service expenditures, particularly in the short run. For this reason, while still holding overall infertility rates and coverage levels constant, Table II-5 illustrates anticipated costs to third parties (reimbursements) under the assumption that the total costs of IVF services will inflate at the rate of 20 percent per yer through 1992, 15 percent per year from 1993 through 1997 and 10 percent per year from 1998 through 2007. Non-IVF costs are assumed to continue to increase at 10 percent per year. In recording the results, we again caution the reader that, while more plausible than the results in Table II-4, these figures still rest on what we feel is the fundamentally unsound premise that coverage and infertility levels will remain constant over the 20 year period.

Given these assumptions, and again using the uniform reimbursement rate of 71 percent, total insurance reimbursements for 1992 are projected to be $1,254 million in 1992, increasing to $2,114 and $5,339 million, respectively, in 1997 and 2007. (See Table II-5, part A.) For comparison, we present, in Table

II-5, part B, projections which, while reflecting the variable rate of growth in IVF expenditures in column B-c, probably err on the low side by virtue of projecting reimbursements for IVF at the continued sharply lower level (than for other infertility services) of 44 percent. The results, again stated in millions of dollars, for 1992, 1997 and 2007 are $1,217, $1,974, and $4,986, respectively.

IV. Immediate and Projected Future Costs to Third Parties If All Aspects of Infertility and Diagnosis Were Covered - Level of Infertility Held Constant

a. Full Coverage

The most simplistic approach to the charge from OTA (Contract: Statement of Work), to determine "the immediate and projected future costs (5,10, and 20 years) to the third party providers if all aspects of infertility diagnosis and treatment were covered (assuming a level of infertility similar to current national statistics)", would be to simply refer back to our Table II-2, in which we projected total expenditures for infertility services over the same time period. In the introduction to this report and in the discussion related to Table II-2, we have already defended the rationale and methods used to arrive at those figures. For the purpose of consistency and comparability, then, we will use Table II-2 as a starting point.

Making the unrealistic assumption that coverage of "all aspects of infertility diagnosis and treatment" could be interpreted to mean 100 percent coverage of all such services

would mean that the costs to third parties would equal the expenditures. In Table II-2, column 1b, those expenditures, stated in millions of dollars, are shown to be $1,036 in 1987, $1,687 in 1992, $2,706 in 1997, and $6,832 in 2007. These figures, again were based on an assumed annual inflation rate of 10 percent per year for all infertility services for the entire period.

We have also stated previously that we feel it is unsound to use a flat 10 percent per year inflator for all infertility services, and we provided reasons why IVF related services are likely to expand more rapidly than non-IVF infertility services. Again, lacking clear evidence to the contrary, we assigned the arbitrary, though we think plausible, inflation rates of 20 percent through 1992, 15 percent from 1993-1997, and 10 percent from 1998-2007 to IVF related infertility services. The results of those calculations, again stated in millions of dollars, are shown in Table II-2, column 4b to be $1,044 in 1987, $1,792 in 1992, $2,978 in 1997, and $7,520 in 2007. These, then, would be the costs to third parties if:

1) There is no change in the level of infertility;

2) all infertility services are covered <u>in full</u> by third parties;

3) the percentage of infertile couples who seek infertility services remains at the present level; and

4) the proportion of primary versus secondary infertility remains the same.

There are valid reasons to question all four of those assumptions. Since the terms of our contract impose, for present purposes, assumption (1), we will only address the others at this time.

b. Less Than Full Coverage

As noted previously, assumption (2) is unrealistic, since it is virtually never true that "covered" services translates into 100 percent coverage. Any number of provisions in an insurance or health service contract may be used to restrict the liability of the third party. The techniques used may include deductibles, coinsurance or copayment provisions, maximum limits (which can be stated either in terms of dollar limits per illness or per family that may or may not be renewable in the next policy year or for the next episode of illness, or as "lifetime limits" for specific forms of treatment), or, increasingly, stipulations that services are only covered in particular settings, such as outpatient rather than inpatient. Examples of all these were cited in Section II-C, above.

While generalizations are always subject to question, it seems safe to suggest that, at least historically, deductibles and coinsurance were most commonly found in "traditional" commercial insurance contracts, whereas the "Blues" offered "first dollar" service benefits which almost never used deductibles, and only rarely used coinsurance or copayments, and then only on selected services -- seldom hospitalization. HMOs by their very nature tend to provide full service benefits for most covered items. As reflected in our earlier discussion, however, there are exceptions.

Major medical or "comprehensive" health insurance policies, whether offered by commercial insurers or BC/BS, normally utilize a variety of deductible and coinsurance provisions, depending on the particular service involved. Many of these plans incorporate a "coinsurance cutoff" or some other device which limits the patient's combined out-of-pocket costs from deductibles and coinsurance to a specific dollar amount, after which the insurer pays 100 percent of covered expenses up to any policy limit that may exist. Maximum benefits under these policies are now, typically, far beyond any reasonable expectation of cost for even the most complex infertility services, and a substantial and increasing proportion have no upper limit.

But we have noted that the structure of the industry is undergoing rapid change. What happens under PPOs, self insurance and various "managed care" plans? While most such plans are outgrowths of "traditional" insurance, among other things, there has been a sharp departure from the historical policy of almost always providing more generous coverage for inpatient (hospital) services than for various forms of ambulatory care. Indeed, there is a growing tendency to cover specified services only if they are performed on an outpatient (ambulatory) basis, where this has been demonstrated to be clinically safe. This pattern is also developing to some extent among "traditional" plans. PPOs also frequently reduce or eliminate deductibles and coinsurance provisions for patients who use the designated providers, thus increasing the potential for full coverage for a wide range of services.

All types of insurers are moving toward requiring "preauthorization" for an increasing number of services, second opinions for elective surgery and a variety of other controls which do not deny coverage, but tend to control utilization. While many of these techniques originated in the context of "managed care" situations, they are now being adopted in virtually all settings.

The provisions just described, which are by no means exhaustive, are likely to affect infertility related services in a variety of ways. Again, referring to Section II-C, we have seen the application of lifetime limits and limited cycles of treatment in a given time period applied to some infertility treatments, and selective coinsurance applied to others. We have seen both company practice and legislative fiat limit coverage to outpatient services. We also know that an increasing proportion of infertility services are being performed on an ambulatory basis (29,31,32), driven in that direction both by the pressure generated by these selective insurance provisions and, quite independently, by rapid changes in medical technology. As some of the more expensive infertility treatments grow in acceptance (because they are better known, clinically proven and no longer "experimental") and demand (because they will, increasingly, be "covered"), more infertile couples will be shielded by out-of-pocket limits.

What, then, will be the overall impact of these changes in industry composition and policy provisions even if we can envision at least some coverage for all infertility services? While there is no way to develop a precise answer with the

limited data available, it is more than reasonable to assume that the result will lie somewhere between the present 71 percent level for all non-IVF infertility services and the 100 percent level described in the first part of this section. The latest OTA data available to us that classify, by source of payment, various classes of infertility services (OTA May 1987 draft, Table 10-8, p. 10-50) are from 1980. (IVF not included) That source shows 78 percent of all hospital based infertility charges covered, ranging from a high of 83 percent on inpatient services to a low of 61 percent for outpatient services. We expect coverage of inpatient services to improve somewhat while that for outpatient services should improve markedly over a 20 year span. Recent HIAA data (1984) show that nationally over 91 percent of all personal health care expenditures for hospital care are reimbursed by third parties.(30) This figure has declined marginally in recent years, a reflection, in all likelihood, not of more restrictive coverage, but of a rise in the number of uninsureds that probably will not be permanent. The same OTA draft showed 58 percent of all physician charges covered, but the range was from 29 percent on bills under $100 to 83 percent on charges over $300. Many of the outpatient procedures performed for infertility patients fall in this higher price range. For the country, HIAA showed 72 percent of all physician expenditures

covered. (30) Over 20 years, we expect this national figure to rise a little, and the figure for infertility services should rise to an almost equal level. HIAA does not separately report the "other professional", "drug" and "other health" categories shown by OTA, settling instead upon the categories of "Dentists" services," "nursing home care," and "other health services," so direct comparisons are not possible in these areas. Their numbers do, however, permit a calculation showing 72 percent of total personal health care expenditures covered, which is close to the overall figure for infertility services we have cited above. The HIAA figure, however, is held down by very low current coverage levels for dental (35 percent) and nursing home (50 percent) services, neither of which play a role in connection with infertility treatment.

In Table II-6, we show our estimates of the immediate and projected future costs to third parties of infertility services if all aspects of such treatment are covered at our arbitrarily assigned composite rates of reimbursement. In Table II-2, column 4-b, we show projections of total costs for all infertility services (1987,1992,1997, 2007) based on an annual inflation rate of 10 percent for non-IVF services and rates ranging from 20

percent to 10 percent for IVF services over time. In Table II-3-B and II-5-B we projected the total costs to third parties based on those expenditures, while holding insurance coverage constant at present levels. It can be shown that the resulting composite rate of reimbursement was 69 percent. We will now assume that immediate coverage of all infertility services, as stipulated above, would initially be accompanied by substantial internal limits, but we still hypothesize an immediate sharp rise in the composite reimbursement rate, to 75 percent. By 1992, we assume that many of those restrictions will have been lifted, resulting in a composite reimbursement rate of 80 percent. Beyond 1992, we expect a slower expansion, to 83 percent in 1997 and 85 percent in 2007. This last figure would match the overall third party reimbursement for hospital and physician charges only, as reported by HIAA for 1984. (30) That figure is also likely to have risen by 2007, though we doubt, even if some form of national health insurance has evolved by then, that the composite rate will exceed 90 percent. There are too many sound economic and political reasons for retaining at least some out-of-pocket costs for the consumer. We also expect reimbursement for all infertility services to remain at least a little below the level for all hospital and physician services, which have traditionally been most liberally compensated by insurers.

If these assumptions prove reasonable, then, Table II-6 shows costs to insurers to be $783 million in 1987, $1,433 million in 1992, $2,472 million in 1997 and $6,392 in 2007. These results, of course, have been based on the assumption that demand remained constant in the face of higher reimbursements. That is not likely, as is explained in the next section.

c. Change in Demand

It is a well known fact that the demand for health services, both in the U.S. and around the world, has always been significantly influenced by the existing level of third party reimbursement. Thus, having now assumed that all infertility services are eligible for at least some level of coverage, and that the overall level of reimbursement has improved to the rates shown in Table III-6, we will naturally have to allow for some increase in demand. It is also generally true that there is some lag time involved between when a new coverage is introduced and the demand increase. This is explained by the "learning curve" of consumers and providers of care, who do not immediately perceive the change, and, therefore, require some time before changing behavior. Another factor that contributes to an

increase in demand is improvement in expected results (i.e., technology). This may be a particularly important factor in relation to infertility services, since it is an especially frustrating experience to want a child, yet be unable to conceive. This, among other things, suggests that actual demand will never equal potential demand.

For present purposes, we will retain our original assumptions about fertility rates and the distribution of primary and secondary infertility (see Table II-1), but we will arbitrarily assume graded levels of infertile women (couples) who will seek services from 1987-2007. Without attempting a lengthy defense or justification of our approach, we will simply state the rationale for our assumptions. We would anticipate little change in demand for 1987, which would be the first year of expanded benefits under our assumptions. By the end of the first five years (1992), most potential clients are assumed to be informed of the new benefits and the technology will be better understood on that account. Beyond 1992, as stated in the previous section, the extent of coverage will continue to expand and the technology will continue to improve, but expansion of demand (i.e., the total of those seeking treatment), with rates of infertility held constant, is likely to slow. See Table II-7.

For our purposes, we have assumed an expansion of demand among those with primary infertility from 55 percent in 1987 (up from 51.2 percent in 1986) to 70 percent in 2007. For those with secondary infertility, the change between 1987 and 2007 is from 25 to 33 percent. Note that we are far more comfortable with the direction of change than with the absolute numbers that our estimates produce. In any case, our assumptions lead to demand estimates of 860,000 couples in 1987, 1,040,000 in 1992, 1,093,000 in 1997 and 1,096,000 in 2007. These may be compared with the earlier estimates shown in Table II-1, where demand was held constant.

If we now wish to estimate the cost to third parties of the new level of demand, we need only translate the figures in Table II-6-c, total cost to third parties, to a cost of coverage per couple and then multiply by the larger number of couples shown in Table II-7. This is done in Table II-8. The results indicate that under this combination of assumptions, aggregate third party expenditures would rise to $856 million in 1987, $1,872 million in 1992, $3,407 million in 1997, and $9,075 million in 2007.

d. Change in Proportion of Primary Versus Secondary Infertility

Even if the level of infertility remained constant for the next 20 years, one wonders if it is reasonable to assume that the relative magnitude of primary and secondary infertility will remain constant. Some recent research on this issue discusses a variety of factors that could have an influence on this mix, but concludes that over the period from 1965-1982 there was no statistically significant change. (34) In the absence of any evidence to the contrary, we accept their findings and will assume the ratios to remain constant at .3 primary and .7 secondary.

V. Projected Future Costs (5,10 and 20 years) to Third Parties If the Incidence of Infertility Increases or Decreases.

Up until now, we have based all calculations on an assumed infertility rate of 8.5 percent. (35) We have also used a constant assumption regarding the percentage of women in the 15-44 age group who are married. (34) Clearly, either of these figures could change over time. For purposes of this study, we have not been requested to consider a change in the marriage rate, but we are directed to consider the effect of both higher and lower infertility rates.

This is readily accomplished, but we are not aware of any significant evidence that predicts such changes. That puts us, once again, in the position of having to make very arbitrary assumptions. Table II-9 shows what we believe would be the upper and lower limits of any such change in fertility over the next 20 years. Starting with our original base, we project changes in fertility of $\pm$.5 percent (to 8.0 or 9.0 percent) by 1992, $\pm$1.0 percent (to 7.5 or 9.5 percent) by 1997, and $\pm$1.5 percent (to 7.0 or 10.0 percent) by 2007. For present purposes, we have

hypothesized a continuing increase/decrease in the rate of infertility through the year 2007, though with a slowing of the rate of change between 1997 and 2007. Again, this is arbitrary, but it illustrates a range of possible outcomes. Our projections start with the number of married women in the 15-44 age group in 1987, from Table II-1, and retain the 30-70 percent split between primary and secondary infertility.

In defense of graded rates, we presume that any changes are likely to take place over time, rather than in large year to year shifts. Marilyn Hirsch and William Mosher provide a useful discussion of the sociodemographic factors that influence infertility.(34)

From Table II-9, the range in the number of infertile women (couples) in thousands by 1992 would be from 2,416 to 2,718. By 1997, the spread would be from 2,254 to 2,855 thousand, and in 2007 the range would be from 2,048 to 2,926 thousand.

Table II-10 divides these women into those with primary and secondary infertility, and then develops the total number who can be expected to actively seek services, based on the enhanced

coverage and demand projections reflected in Table II-7. The results suggest a high-low range of service seekers (in thousands) of 978 to 1,101 in 1992, 965 to 1,222 in 1997, and 903 to 1,291 in 2007.

The final step in calculating the total projected costs to third parties under these alternative infertility assumptions for the years 1992, 1997 and 2007 simply requires a multiplication of the number of couples from Table II-10 times the cost to third parties per couple from Table II-8. This is done in Table II-11.

The numbers that result from these various assumptions are imposing by today's standard, but the assumptions on which they are based seem reasonable, given the many variables that have been described and the dearth of hard data. Furthermore, though large in an absolute sense, they pale to insignificance in the face of projections we have seen for the nation's total health care bill by the end of the century.

If, by 1992, our earlier assumptions about broader coverage and expanded demand and our extrapolation of inflation rates (which are consistent with those experienced over the previous 20 years) are close to the mark, then total cost to third parties

for infertility services should fall between $978 million and $1.1 billion. By the same token, in 1997, the range would be $965 million to $1.2 billion, and by 2007 it would be $903 million to $1.3 billion.

VI. Consequences of Various Levels of Coverage and Infertility Rates on Premiums, Membership Fees and Out-of-Pocket Expenditures

As has been noted in the introduction to this report, virtually no data are available from usual industry sources that deal specifically with infertility services and their cost to various benefit plans. Coverage to date has been limited largely by inadvertance. That is, with few exceptions other than in Maryland, Delaware and Massachusetts, where coverage has either been mandated by law or specifically offered by a major insurer, infertility services have not appeared as named benefits, but have been covered under broad benefit categories such as hospitalization, physician office visits, surgery or drugs, when available.

Indeed, as has been reported, many insurers have even denied claims under those broad categories when they have specifically been reported in the context of infertility treatment. While the vast majority of health insurance in the U.S. is currently on a group basis, with benefit packages normally rated on the basis of actual experience, the contractors do not have available any plan-specific data on either benefits or demographic composition. Under these circumstances, little that is meaningful can be said about the consequences of various levels of coverage and infertility on premiums. What is obvious, both intuitively and

from experience, is that large groups are more likely to have broader, more complete coverage than smaller groups. They are also less likely to react precipitously to one or a few unusually costly episodes. In the current business milieu, however, all firms are trying hard to contain the costs of their health benefits, so additions to existing plans will be carefully examined before being introduced and monitored afterward. Beyond that, as coverage, utilization and infertility rates rise, so, too, must premiums. The reverse, of course, is also true.

On the other hand, with constantly changing/improving technology, it is at least conceivable that demand and coverage could rise, yet total costs would decline because of a new technology which, though costly in itself, might enable most candidates for infertility treatment to avoid the often lengthy, frustrating and cumulatively costly procedures which are now usually required as prerequisites to certain advanced treatments, such as IVF.

Incidently, it can be somewhat misleading, when reading the infertility literature, to assume that some of the more advanced and "exotic" treatments for infertility have very low success rates. (OTA May 1987 draft, Tables 10-2 and 10-5, pp. 10-42

through 10-47) Note that under the OTA's "scenarios," some of the more advanced treatments were shown "at the end of the line," after all else had failed. Clearly, these procedures would show a much higher success rate if tried earlier in the sequence of treatment, while the more promising couples are still "in the game." Some infertility specialists are already beginning to note movement in this direction. (29,31)

Another factor to consider here is that, at least from the employer's point of view, a more expensive procedure utilized early on might more than be compensated for by the reduced lost time, via sick leave or income-loss insurance benefits that might otherwise accumulate during the course of the four stage treatment scenario described in OTA's draft report. More about this in Section VII.

Despite the fact that we feel no useful estimates are possible regarding premiums and membership fees, it is possible to make projections of out-of-pocket costs to patients that at least have the appearance of precision, though in actuality they are really rough estimates. In Table II-11, we arrived at projections of third party payments (both aggregate and per couple), under our stated assumptions for the years 1992, 1997

and 2007. These were based on the arbitrarily assigned coverage levels projected earlier, in Table II-6, of 80 percent in 1992, 83 percent in 1997, and 85 percent in 2007. Working with these numbers, Table II-12 shows the total expenditure range for all infertility services, out-of-pocket costs and insurance costs at both the aggregate and per couple levels. The numbers in Table II-12 reflect the incorporation of all the projections and assumptions we have made in this study. Included are the following:

a) Differential rates of inflation for all non-IVF infertility services (10%) and IVF services (20%-10%) from 1987-2007

b) Assumption that all infertility services are "covered" services

c) An arbitrary assignment of composite rates of reimbursement for infertility services that increase significantly from 1987-2007

d) An arbitrarily selected "sliding" change in the level of demand for infertility services by primary and secondary infertile couples, 1987-2007

e) Arbitrarily selected assumptions about changes in the rate of infertility from 1987-2007.

The results show that average total expenditures per couple will soar from $2,250 to $9,741 between the years 1992 and 2007. Insurer costs per couple will rise from $1,800 to $8,280 in the

same period, while individual couples will face average out-of-pocket costs in the much more modest range of $450 to $1,461. These numbers, taken from Part A of Table 11-12 should be used with care, however, since they represent average costs per case. There will continue to be very wide ranges around the average, depending on the specific services utilized by any one couple and the particular provisions of their third party arrangements.

In Part B of Table II-12, we present aggregate projections of expenditures for infertility services. Total expenditures reflect a much wider range in this portion of the table, since they are significantly influenced by the varying levels of demand attendant to our alternative assumptions about infertility. Under the assumption of a falling infertility rate, total expenditures would range from $2.2 billion dollars in 1992 to $8.8 billion in 2007. If we assume a rising infertility rate, those expenditures could rise from $2.5 billion in 1992 to $12.6 billion in 2007. For insurers, the range would be from $1.7 to $7.5 billion under falling infertility, and from $2.0 to $10.7 billion in 2007 if the rate of infertility rises as shown.

While we are reasonably comfortable with most of the assumptions that are reflected in Table II-12, it remains true that many of them were necessarily arbitrary and non-verifiable.

When a series of assumptions are incorporated into sequential calculations, the potential for error is great. Therefore, the results must be used with caution. Nevertheless, we feel that all of the assumptions that have been used, except for the changes in infertility rates, can be strongly defended at least in terms of direction, if not magnitude. We do believe that the cost of IVF services will rise more rapidly than the cost of other infertility services, at least in the short run. There is no doubt that third party coverage for infertility related services will continue to expand in future years, and it is certain that expansion of coverage will increase demand. Because we have no reliable basis for anticipating a specific change in infertility rate, we have calculated high/low options, and we are satisfied that reality is likely to fall within the range provided.

In summary, then, premiums and membership fees as well as out-of-the pocket expenditures for infertility services will rise significantly over the next 20 years, but they will continue to be a very small fraction of the total cost of health care, whether considered at the national, corporate or average couple level. For some individual couples, however, costs could be fairly high, but they are unlikely to exhaust available major

medical benefits, and couples will, in general, be protected from overly onerous out-of-pocket expenses by the increasingly common practice of insurers and other third parties to include out-of-pocket limits in their policies.

VII. Non-medical Costs To Employers of Individuals Being Treated For Infertility

The infertility related costs to employers of workers under treatment, other than the medical expenses that are covered under the existing employee health plan (which would be directly reflected in experience rated premiums), would appear to fall mainly under the heading of loss of time benefits. As was alluded to in the previous section, it is not inconceivable that the cumulative effect of loss of time costs attributable to a worker -- particularly a female worker -- who goes through all five stages of the infertility treatment scenarios presented in the OTA May 1987 draft (Table 10-4, p. 10-46) could exceed the cost of some of the more expensive treatments that are, for the most part, withheld until the last stages (e.g., Scenarios III and IV, OTA May 1987 draft, pp. 10-43 through 10-46) under current practice. It is not feasible, based on currently available data to make any valid calculations that would be cost specific for the general population of infertile couples, but discussions with several infertility specialists as well as our work in connection with Task III of this contract, for which far

more detailed data are available from the Veterans Administration, enable us to make some pertinent observations.

In discussions with two physicians who specialize in male infertility problems (29,32), we were told that the four most common surgical treatments for men fall under the headings of varicocelectomy, testicular biopsy, vasectomy reversal and scrotal exploration. Both specialists indicated that a varicocelectomy only rarely results in an overnight hospital stay -- "almost never" for the physician in the unversity medical center and "5-10 percent at the most" for the one in a community based infertility center. It was stated that "less than 1 percent" of male patients end up with an overnight hospital stay as the result of a scrotal exploration or a testicular biospy (exploratory procedures) that leads to major surgery. "A maximum of 2-5 percent" of those who have vasectomy reversals end up with complications (e.g., swelling, bleeding) that require, at most, a single night in the hospital. Thus, it would seem there are no male infertility services (treatments) that involve significant job time loss in terms of hospitalization.

For women, our contacts (7,29,31) noted that there are some more serious procedures that can involve anywhere from 5-7 days of hospitalization, plus another few days at home to complete

recuperation before returning to the job. Primary among these procedures are tubal reconstructive surgery and laparatomies. There was considerable variation in the practices of the specialists we contacted. The physician located in a community based facility (29) indicated that these procedures were used in only 20 percent of the cases now, and that the rate has been and continues to decline quite rapidly as IVF matures, and women opt to avoid surgical treatment prior to IVF. Our university medical school based specialist (31) reported that about 50 percent of his patients have surgery, but he pointed out that because of his location he deals with a very skewed sample. With regard to laparascopies, we were told that, while it used to regularly involve a two-night hospital stay, only 5-10 percent of the patients now fail to have the procedure performed on an outpatient basis. Based on OTA data (OTA draft May 1987, p. 10-46), nearly half of infertile couples may use Scenario III, which includes tubal surgery, so time loss could become a significant factor.

In connection with Task III of this contract, we have presented some more detailed exhibits which illustrate the components of OTA's treatment scenarios. (See Tables III-6 and

III-7) While most of the data in those tables are derived from a detailed analysis of infertile veterans, which may not be representative of the total infertile population, they do provide some useful guidance in trying to estimate time loss. It shows, for example, that there would be roughly 18 clinic visits per couple for those who go through Stage I - "simple diagnosis and treatment of oligomenorrhea." This is presumed to include 100 percent of infertile couples. Stage II, "complete infertility evaluation" involves 4 clinic visits, with about 70 percent of infertile couples using this step. In Stage III, (tubal surgery), there are only 49 percent of the couples that continue to need treatment, and there are 15 clinic visits involving drug treatment plus, of course, the surgical procedures discussed previously. For the 17 percent of couples who continue treatment into Stage IV, IVF, another 6-10 clinic visits are anticipated. Table III-7 adds an extra 4 clinic visits for "other male services".

In summary, for couples going through all 4 stages of the OTA scenarios, we could expect as many as 50 clinic visits, at least some of which involve both spouses, and a minimum of 5-7 days of hospitalization to be accumulated. This could be spread

over a period of 4.5 years (OTA May 1987 draft, p. 10-46) or more (note earlier reference to Maryland law which requires 5 years of treatment before conferring coverage for IVF). As an arbitrary rule of thumb, we could assign roughly one-half day to any regular clinic visit that involves only an examination, and one full day for those visits that involve a "procedure." By this method, there would be 25-50 lost work days for those who go through all 4 stages of treatment just from clinic visits. When hospital days plus post-hospital recuperation are added in, total time could be as much as 60 days.

We assume that, by the very nature of current treatment patterns, the heaviest burden of lost time would fall on women. The male partner is, typically, not involved in as many procedures or office visits, and a very small fraction of them get involved in surgery requiring hospitalization. At the same time, the nature of the infertility problem is such that it would not be unusual for both parties to travel to the clinic together, if not for treatment, then for "moral support." Thus, the total lost time per couple could be even higher than the estimated 60 days.

It might be noted that, since the estimated lost days would be spread over up to 4.5 years, a substantial proportion of them could be "covered" under standard sick leave procedures, though this may not always be the case. Stage I of the OTA scenarios, for example, involves 18 clinic visits in an estimated period of only 6-9 months. Patients in this category could easily exhaust their annual sick leave. The 4 visits estimated during the 12 months of Stage II present no problem.

Stage III is more complicated, since it can last as long as 18 months, but it involves up to 15 clinic visits and, probably, at least one work week in the hospital. Depending on timing, this could, again, exceed available sick leave. Stage IV, IVF, may have as many as 10 visits in 6 months, but should not, by itself, drain a worker's annual sick leave. We believe it would be rare for the treatment of infertility to have any significant impact on a company's disability income insurance plan.

In the absence of adequate age, sex and income specific data, we will not attempt to present specific dollar estimates for wage loss. In any case, from the employer's point of view, the potential disruption in work flow that could result from

frequent half-day absence may be more of a concern than the actual cost of sick leave, and the "hidden costs" of infertility problems may also be of concern. Because the desire to bear children is usually quite strong, inability to do so can be a traumatic experience. The impact that this can have on a worker's emotional state may have a pronouced effect on the ability to perform at peak level on the job. This alone could be a reason to include infertility benefits in the company health plan, since it is generally accepted that workers who are content are more productive. Of course, every success in this field is likely to yield both a maternity claim under the company health plan and either a maternity leave or a resignation!

VIII. Caveats and Conclusions

The assumptions used in developing the estimates of present and future third party coverage of infertility treatment have been made explicit either at the outset or prior to making them operational in the various stages of the estimating process. As is also true in connection with Task III, dealing with the economics of infertility associated with military service, some of the assumptions have their roots in scientific studies, while others rest largely on informed guesses about an essentially unknown future. Moreover, since we have been asked to make projections as much as 20 years into the future, we are humbled by the knowledge that relatively modest miscalculations, when compounded, may result in substantial error.

Our starting assumptions on population, marriage rate and infertility rate are based on scientific studies. While population projections have, historically, often proved to be very wide of the mark, we do not anticipate that to be a major problem in this instance. As has been noted, most of the subjects of our projections have already been born, thereby

reducing the potential impact of an unanticipated change in the birth rate. Use of the Census Bureau's "Middle Series" of projections, then, seems reasonable.

There are, however, many things that could theoretically cause significant changes in both marriage and infertility rates, including economic, political, social, medical and environmental forces, to name the most obvious. Though no evidence of statistically significant trends have been reported in these rates, that could easily change over a 20 year period. Though we have not shown any projections based on a change in the marriage rate, Section VI does show the impact of hypothetical changes in infertility levels.

While the estimates used for the starting levels of expenditure for infertility services have their roots in careful studies conducted by the OTA (for IVF expenditures) and the NMCUES, the former reported a potential range for the year 1986 alone of from $61 to $110 million, an 80 percent variation! OTA, quite reasonably, it seems, assumed an actual level of expenditure in the middle of the range, at $85 million. Though hardly the basis for rock-solid confidence, no better figures

were available upon which to base our projections. The NMCUES data, though probably quite good when originally collected in 1980, have already been extrapolated for 7 years, and we have taken that an additional 20 years. Given the changes in technology and mix of service utilization that have already and surely will continue to take place, it takes a great deal of faith to expect high levels of accuracy in the projections to the year 2007.

Economic forecasts, too, have been notoriously unreliable over time. Yet, curiously, we feel more comfortable with the assumed inflation rate of 10 percent per year that we have adopted, along with OTA, for our projection of non-IVF infertility costs than with some of the other assumptions that have been made, because this is very close to the rate of inflation for all medical care services that has been sustained over the past 20 years. Nevertheless, with almost everyone expressing concern about the need for cost containment in the health arena, even this seemingly intractable rate could change. As noted, we have anticipated a higher rate of inflation, at least initially, for the recently introduced IVF services.

The remaining assumptions that have been incorporated into this study are even more arbitrary than those already discussed, though they can be defended as plausible. There simply are no reliable data, or in some cases, any data at all, on the specifics of various health care plans as they relate to infertility services. The dramatic changes that continue to develop in the structure of the health insurance industry and the impact that may have on coverages defy precise estimation. Nevertheless, in incorporating these many variables, we are at least confident of the direction of our projections, and we feel that the magnitudes are plausible, even though they are arbitrary.

Finally, though we have presented some average cost per couple figures in our findings, they have been used primarily for the purpose of arriving at aggregate expenditures as the population grows. Because of the way they were derived, the absence of standardized treatment protocols and other age specific information, the average cost per couple figures should in no way be interpreted as representing "typical" costs for an infertile couple.

Given all of the above, our conclusions are that the extent of third party coverage for infertility services will certainly increase over the next 20 years, and this increased coverage combined with continuing technological advances and greater consumer awareness of the availability and effectiveness of these services, will produce a quite dramatic increase in the level of demand. Naturally, the result will be a significant increase in the level of payments for infertility services by third parties. The absolute level of out-of-pocket expenditures by consumers is also likely to rise sharply, though they will decline as a percentage of total expenditures. In the short run, there will probably be more state legislative action to mandate specified benefits, but in the longer run, these efforts should be of diminishing importance. Indeed, in some cases such legislation may actually hinder, rather than help, the expansion of benefits (.e.g., Maryland requires 5 years of treatment prior to eligibility for IVF). We also expect, over time, to see some of the present restrictions on donor eggs and sperm to be relaxed, and there may be a tendency to use some of the newer, often higher priced technologies earlier in the treatment process, as they are recognized to be more effective, and as the direct and indirect time costs of other extended therapies are better understood.

Finally, even with pronounced increases in coverage, demand and utilization of infertility services, they will remain a relatively insignificant component of total health care services and costs in the U.S. in the year 2007.

TABLE II-1 Projection - Total Number of Infertile Married Women, ages 15-44, Seeking Infertility Services (in thousands) - 1987 - 2007 (i.e. Number of Infertile Couples)

Year	1987	1992	1997	2007
All women - 15-44 (1)	57,237	58,080	57,786	56,276
52% of women married (2)	29,763	30,202	30,049	29,264
8.5% of married women infertile (3)	2,530	2,567	2,554	2,487
Infertile women, by type of infertility:				
30% = primary	759	770	766	746
70% = secondary (3)	1,771	1,797	1,788	1,741
% infertile women who seek infertility services, by type of infertility:				
51.2% = primary	389	394	392	382
22.45% = secondary (3)	398	402	401	390
Total infertile women (couples) who seek infertility services	787	796	793	772

(1) Calculated from Table 6, "Projections of the Population, by Age, Sex and Race for the United States: 1983-2080," Current Population Reports, U.S. Dept. of Commerce, Bureau of the Census, Series P-25, Series 14, Middle Series. (33)

(2) Calculated from Mosher, William D., Ph.D. and Pratt, William F., Ph.D., "Fecundity and Infertility in the United States, 1965-82, NCHS Advancedata, Number 104, February 11, 1985, Table 1. (34)

(3) Hirsch, M.B., and Mosher, W.D., "Characteristics of Infertile Women in the United States and their use of Infertility Services, forthcoming in Fertility and Sterility, April or May, 1987. (35)

TABLE II-2: Projected Expenditures for Infertility Services Under Various Assumptions, 1987-2007, By Infertile Couple and By Total Infertile Population(1)

YEAR	(1) Total costs of all infertility services increased at 10% per year (1)		(2) Total costs of all infertility costs except IVF, increased at 10% per year (2)		(3) Total of costs of all IVF service costs under various rates of increase (3)		(4) Total of columns 2 & 3, costs of all infertility services, including variable increase for IVF	
	a) per couple	b)Population (000,000)	a) per couple	b)population (000,000)	a) per couple	b)population (000,000)	a) per couple	b)population
1987	$1,316	$1,036	$1,196	$ 941	$ 131	$ 103	$1,327	$1,044
1992	2,119	1,687	1,926	1,533	325	259	2,251	1,792
1997	3,412	2,706	3,101	2,459	654	519	3,755	2,978
2007	8,850	6,832	8,045	6,211	1,696	1,309	9,741	7,520

Notes:

(1) All projections used herein are based on the starting point of $850 million in non-IVF infertility expenditures and $85 million in IVF expenditures in 1986, as reported in the May, 1987 OTA draft, p.10-16; for the source of the census data, see note 1, Table II-1.

(2) We have adopted the 10% inflation rate utilized by OTA (May draft report, p. 10-16) as a reasonable one to reflect annual changes in the cost of medical care and the incidence of infertility diagnosis and treatment. It is reasonably consistent with the overall inflation for medical care costs as reflected in the Consumer Price Index by BLS over a period of many years. There is no compelling evidence to suggest that this will change in the foreseeable future.

(3) In recognition of rapidly changing technology and projected growth in demand for IVF services, given that the technology is less than 10 years old in the U.S., we have, in this series, projected a 20% annual growth in expenditures through 1992, 15% from 1993-1997, and the overall 10% rate for 1998-2007. It seems reasonable to anticipate some leveling off in growth after an initial surge in use, coverage and price.

TABLE II-3: Estimated Costs to Third Parties of Infertility Services-1987, Under Alternative Assumptions

A. If all expenditures are reimbursed at the same rate:

	Total Expenditures (000,000)	Rate of Coverage	Costs to Third Parties (000,000)
All Services:	$1,036 (1)	.71 (2)	$735.6

B. If IVF expenditures are reimbursed at a different rate than other infertility services:

	Total Expenditures (000,000)	Rate of Coverage	Costs to Third Parties (000,000)
Non IVF Services:	$ 941 (3)	.71 (2)	$668.1
IVF Services :	95 (4)	.44 (5)	41.8
Total	$1,036		$709.9

Notes:

(1) See Table II-2, column 1b
(2) OTA May 1987 draft, pp. 10-16
(3) See Table II-2, column 2b
(4) Table II-2: Column 1b - 2b
(5) OTA May 1987 draft, Table 10-5, pp. 10-47

TABLE II-4: Estimated Costs to Third Parties of Infertility Services - 1992, 1997 and 2007- under Alternative Reimbursement Assumptions Using 10 Percent Inflation Rate for all Services

A. If all expenditures are reimbursed at the same rate (71%)

Year	(a) Total Expenditures for Infertility Services (2)	(b) Costs to Third Parties
1992	$1,687	$1,198
1997	2,706	1,921
2007	6,832	4,851

B. If all non-IVF expenditures are reimbursed at a constant 71 percent rate, and all IVF expenditures are reimbursed at 44 percent.

Year	(a) Total Expenditures for All Non IVF Infertility Services (3)	(b) Costs to Third Parties for All Non-IVF Infertility Services	(c) Total Expenditures for All IVF Services(4)	(d) Costs to Third Parties of IVF Services	(e) Total Costs to Third Parties at All Infertility Services(b)+(d)
1992	$1,533	$1,088	$154	$ 68	$1,156
1997	2,459	1,746	247	108	1,854
2007	6,211	4,410	621	273	4,683

Notes:

(1) Assumes that coverage continues at current levels, with no change in the leve of infertility
(2) See Table II-2, column 1b
(3) See Table II-2, column 2b
(4) Derived from Table II-2 (Column 1b-Column 2b)

TABLE II-5: Estimated Costs to Third Parties of Infertility Services -1992, 1997 and 2007 - Under Alternative Reimbursement Assumptions, Using a constant Inflation rate for non-IVF Services and a Variable Inflation Rate for IVF (000,000) (1)

A. If all expenditures are reimbursed at the same rate (71%)

Year	(a) Total Expenditures for All Infertility Services (2)	(b) Costs to Third Parties
1992	$1,792	$1,254
1997	2,978	2,114
2007	7,520	5,339

B. If all non-IVF expenditures are reimbursed at a constant 71 percent rate, and all IVF expenditures are reimbursed at 44 percent.

Year	(a) Total Expenditures for All non-IVF Infertility Services (3)	(b) Costs to Third Parties for All non-IVF Infertility Services	(c) Total Expenditures for All IVF Services (4)	(d) Costs to Third Parties of IVF Services	(e) Total Costs to Third Parties of All Infertility Services(bxd)
1992	$1,553	$1,103	$ 259	$114	$1,217
1997	2,459	1,746	519	228	1,974
2007	6,211	4,410	1,309	576	4,986

Notes:
(1) Assumes that coverage continues at current levels, with no change in the level of infertility
(2) See Table II-2, Column 4b
(3) See Table II-2, Column 2b
(4) See Table II-2, Column 3b

TABLE II-6: Immediate and Projected Future Costs to Third Party Payers if all aspects of infertility diagnosis and treatment were covered, with arbitrary levels of coverage as stated

Year	(A) Expenditures (1) (000,000)	(B) Composite Rate of Reimbursement (2)	(C) Total Cost to Third Parties (000,000)
1987	$1,044	.75	$ 783
1992	1,792	.80	1,433
1997	2,978	.83	2,472
2007	7,520	.85	6,392

Notes:

(1) Table II-2, Column 4-b

(2) Arbitrary extrapolation from present level of 69%; see discussion in related text

TABLE II-7: Change in Demand for Infertility Services, 1987-2007, assuming stable infertility rates, with expanded insurance coverage and improved technology

	1987	1992	1997	2007
1) Number of infertile women (000) by type of infertility (1)				
Primary	759	770	766	746
Secondary	1771	1797	1788	1741
2) % seeking treatment by type of infertility (2)				
Primary	55	65	68	70
Secondary	25	30	32	33
3) Number of infertile women seeking treatment by type of infertility (1x2) (000)				
Primary	417	501	521	522
Secondary	443	539	572	574
4) Total infertile women (couples) seeking treatment (000)	860	1,040	1,093	1,096

Notes:

(1) See Table II-1

(2) Arbitrary projections based on original levels of 51.2% and 22.4%, Table II-1

TABLE II-8: Costs to Third Parties of Infertility Coverage from 1987-2007, Based on Fertility and Coverage Levels in Table II-6, and Demand Shown in Table II-7

	1987	1992	1997	2007
a) Cost to third parties per couple (1)	$ 995	$1,800	$3,117	$8,280
b) Couples Demanding Services (2) (000)	860	1,040	1,093	1,096
c) Total cost to third parties at new level of demand (a) x (b) (000,000)	$ 856	$1,872	$3,407	$9,075

Notes:

(1) Derived by dividing figures in Table II-6, Column c by the total number of couples in Table II-1

(2) Table II-7

TABLE II-9 Projection - Total Number of Infertile Married Women, Ages 15-44, from 1992-2007, Based on Alternative Rates of Infertility (000)

	1992	1997	2007
Number of married women (1)	30,202	30,049	29,264
Number of infertile women (2) (Falling Rate)	2,416	2,254	2,048
Number of infertile women (3) (Rising Rate)	2,718	2,855	2,926

Notes:

(1) From Table II-1
(2) At 8.0% in 1992; 7.5% in 1997; 7.0% in 2007
(3) At 9.0% in 1992; 9.5% in 1997; 10.0% in 2007

TABLE II-10 - Total Number Seeking Infertility Treatment Based on High/Low Projections of Infertility and Enhanced Coverage 1992-2007

	1 1992		2 1997		3 2007	
	a) 8.0%	b) 9.0%	a) 7.5%	b) 9.5%	a) 7.0%	b) 10.0%
a) Total number infertile (1) in thousands	2,416	2,718	2,254	2,855	2,048	2,926
Primary (.3)	725	815	676	857	614	878
Secondary (.7)	1,691	1,903	1,578	1,998	1,434	2,048
b) % seeking treatment by type of infertility (2)						
Primary	65	65	68	68	70	70
Secondary	30	30	32	32	33	33
c) Number seeking treatment by type of infertility (axb) in thousands						
Primary	471	530	460	583	430	615
Secondary	507	571	505	639	473	676
d) Total seeking treatment in thousands	978	1,101	965	1,222	903	1,291

Notes:

(1) From Table II-9

(2) From Table II-7

TABLE II-11 Total Costs to Third Parties of Infertility Coverage from 1992 - 2007 Based on Expanded Coverage and Alternative Rates of Infertility

	1		2		3	
	1992		1997		2007	
a) Infertility Rate	a) 8.0%	b) 9.0%	a) 7.5%	b) 9.5%	a) 7.0%	b) 10.0%
b) Cost to third parties per couple (1)	$1,800	$1,800	$3,117	$3,117	$8,280	$8,280
c) Total seeking treatment in thousands (2)	978	1,101	965	1,222	903	1,291
d) Total cost to third parties in millions (b x c)	$1,760	$1,982	$3,008	$3,809	$7,477	$10,689

Notes:

(1) From Table II-8

(2) From Table II-10

TABLE II-12: Total Expenditures for all Infertility Services, Broken Down by Third Party and Out-of-Pocket Components, by Couple and by Total Number of Service Seekers, Using Alternative Projections of Infertility, 1992-2007

A. By Couple (Not Affected by Rate of Infertility)

	1992	1997	2007
a) Cost to Third Party/Couple (1)	$1,800	$3,117	$8,280
b) Out of Pocket Costs/Couple (2)	450	638	1,461
c) Total Expenditures/Couple (3)	2,250	3,755	9.741

B. All Service Seekers (Using Alternative Infertility Assumptions)

	(1) 1992		(2) 1997		(3) 2007	
a) Infertility rate	a) 8%	b) 9%	a) 7.5%	b) 9.5%	a) 7%	b) 10%
b) Total cost to third parties, all service seekers in millions (4)	$1,760	$1,982	$3,008	$3,809	$7,477	$10,689
c) Total out of pocket costs, all service seekers in millions (5)	440	496	616	780	1,319	1,886
d) Total expenditures for all service seekers, in millions	2,200	2,478	3,624	4,589	8,796	12,575

Notes:

(1) From Table II-8
(2) Obtained by subtracting (a) from (c) [Part A]
(3) Calculated by dividing (a) [Part A] by the appropriate rate of reimbursement shown in Table II-6, column b.
(4) From Table II-11, Row d
(5) Obtained by subtracting (b) from (d) [Part B]
(6) Calculated by dividing (b) [Part B] by the appropriate rate of reimbursement shown in Table II-6, column b.

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Task III: The Economics of Infertility Associated with Prior Military Service

I. Introduction

The contractor is to analyze the cost to the Veterans Administration (VA) of providing infertility treatment (including IVF, artificial insemination and GIFT (1) to all veterans with infertility problems and (2) to veterans with service-related infertility. The cost estimates are to be related to alternative methods of providing for such treatment, including provisions in all VA medical facilities or in regional infertility treatment centers in VA hospitals for all eligible veterans. In addition, for veterans with service-connected disabilities related to infertility, (a) the cost estimates are for financing services by contract with private infertility centers, (b) with contractual coverage and with a typical copayment plan, or (c) by one-time, lump sum grants to infertile veterans to pay for private treatment.

Some definitions and assumptions are common to the different estimates of cost and should be explicit at the outset.

1. Infertility is here defined as it is elsewhere in the OTA study to refer to couples where "neither partner is surgically sterile, a couple is classified as infertile if,

during the preceding twelve months or longer, they were continuously married, presumed to be sexually active, had not used contraception, and had not conceived."

2. An infertile veteran is a veteran who is a member of an infertile couple.

3. Infertility treatment is to be provided for spouses of eligible infertile veterans as well as for the infertile veterans.

4. Infertility treatment centers in VA facilities are to treat all eligible infertile veterans and/or their spouses.

5. Veterans with service-related infertility and other infertile veterans are to be treated on the basis of current general eligibility for treatment. Some may be required to make copayments if their incomes exceed certain levels. Those with specific service-connected medical disabilities that can result in infertility are eligible for free infertility treatment.

These assumptions and definitions help to clarify the premises of cost estimates concerning the VA's responsibilities for expansion of the infertility treatment for veterans and for the provision of such treatment for non-veteran spouses. As noted by the OTA initial drafts, the VA has not viewed infertility as a primary disability. Therefore, the VA has held that it lacks statutory authority to offer certain types of infertility treatment, such as artifical insemination or IVF, or to offer infertility services to non-veterans. Moreover, the extent of relatively simple infertility procedures offered has varied widely among facilities, depending on the expertise of the medical staff. Mandatory provisions for infertility services would require changes in regulations and/or statutory authority as well as in the resources available.

This report on the costs of alternative methods of providing or financing of veterans' infertility services is in several sections. Section II deals with the veterans population and the potential numbers of persons who would use VA infertility services. The population of all infertile veterans and related demand are discussed first; this is followed by discussion of the population of and demand by veterans with service-connected disabilities related to infertility.

Section III deals with the provision of services in VA medical centers. The initial discussion deals separately with estimates of start-up cost for capital equipment and staff training and then with continued costs of staffing in each medical center and for the system of 172 medical centers. This is then related to similar types of cost and patient load for ten regional infertility service clinics in selected medical centers. These discussions relate the clinic capacities to numbers of patient visits but do not include estimates of costs of ancillary services.

Section IV relates estimated numbers of infertility patients to the operation and costs of VA infertility centers. Capacities are related to demand estimates and ancillary costs are added to staff costs of the centers for the two eligible veteran groups, all infertile veterans and those with service-connected disabilities related to infertility.

Section V considers two alternative for services for the eligible disabled veterans. One involves private sector contractual coverage of all infertility services required by such veterans on the basis of total coverage and a typical copayment

plan. The other involves offering a one-time, lump sum grant to such veterans to cover the average cost of such treatment in the private sector.

The final section includes caveats some and conclusions from the earlier sections and includes some cost comparisons relating to the alternative eligible populations and the alternative methods of providing for and financing infertility services for veterans.

II. Eligible Veteran Populations and Demand for Services

1. Estimates of Eligibles If Infertility Treatment is Provided for All Veterans

In order to estimate the population of veterans who may be eligible for infertility services, it is necessary to make some simplifying assumptions that, while not realistic, permit us to deal with the order of magnitude of that population. Among the simplifying assumptions to be noted at the outset are that there are no marriages between veterans and that couples with female spouses under 45 years old are best represented by female veterans under 45 years old and by male veterans under 55 years old. Use of these assumptions tends to overstate the eligible population to the extent that female veterans are married to male veterans and to the extent that male veterans under 55 years old are married to women who are 45 years old or older. This may, in part, be offset by marriages of male veterans 55 years old and older to women who are under 45 years old.

The number of veterans living in the United States and Puerto Rico in 1985 has been estimated at 27.8 million, including 1.17 million female veterans who accounted for 4.2 percent of the

total; of the female veterans, 42 percent (about 496,000) were under 45 years old. The 26.7 million male veterans represented nearly one third (32 percent) of the male population 17 years old or older. There were about 14.7 million male veterans under 55 years old in 1985. (See Table III-1. Veterans Administration, Annual Report, 1985, pp. 2-4, 163, and The Female Veteran Population, 1983, p. 13.)

The 27.8 million total veteran population has been reported to have 22 million spouses, indicating that about 79 percent were currently married. (Veterans Administration, Annual Report, 1985, p. 5.) In the absence of age-specific marriage rates for male veterans, who comprised more than 95 percent of the total veteran population, it may be reasonable to assume that 79 percent of the male veterans under 55 years old, or 11.6 million, were currently married in 1985. About 59 percent of female veterans were reported to be married. (Veterans Administration, Survey of Female Veterans, 1985, p. 99.) This is roughly consistent with the rates for female veterans living with spouses reported at 61 percent for those between 25 and 34 years old and 64 percent for those between 35 and 44 years old. Applying the

59 percent marriage rate to the 496,000 veterans under 45 years old indicates that about 293,000 of them were currently married. (See Table III-2)

Under the assumption of no intermarriages between veterans, then, it is possible to estimate that there were about 11.9 million couples that included a female veteran under 45 years old or a male veteran under 55 years old. We assume the females of such couples, then, to be under 45 years old.

Except for veterans with specific, service-related conditions that could result in infertility (see discussion below), there appears no reason to believe that the prevalence of infertility among veterans would differ significantly from that of the general population. Some have pointed out that, in the absence of severe disabilities such as spinal cord injuries, those who were selected partly on the basis of physical condition to enter the armed forces are likely to come out in the same or better condition. (Dr. John Mather, Associate Executive Director, Medical and Research Affairs, Paralyzed Veterans of America, personal interview, May, 1987.) Moreover, 71 percent of female veterans had at least one child, and 76 percent had bad pregnancies, with some ending in miscarriage, stillbirth and

abortion. Of those who have had one or more children, 58 percent had a child by the age of 25. This percentage for female veterans is comparable to the 61 percent of the general population in which 61 percent of women with children had their first child by the age of 25. (Veterans Administration, Survey of Female Veterans, 1985, pp. 98 et seg.)

The 1982 estimate of infertility among married women between 15 and 44 years old has been reported at 8.4 percent for the general population. (Mosher, W.D., and Pratt, W.F., "Fecundity and Infertility in the United States, 1965-82," NCHS Advance Data, No. 104, February 11, 1985, p. 4.) That prevalence rate can be applied to the 11.9 million estimate of married veteran couples with female spouses under 45 years old. This would suggest that nearly one million infertile couples could be eligible for treatment provided by the VA if such treatment were to be offered to all veterans with infertility problems. OTA has elsewhere reported that male factors are believed to be the major cause of infertility in 20 to 40 percent of all infertile couples and to contribute to infertility in another 20 percent, while female factors account for or contribute to 50 to 70 percent of infertility among couples. (OTA May draft, pp. 9-4 and 9-5.) On that basis, between 400,000 and 600,000 males and 500,000 to

700,000 females may be expected to be eligible for infertility treatment beyond the initial examinations if the Veterans Administration is to provide such treatment for all infertile veterans. OTA has also estimated that .625 percent of the female infertile population received in vitro fertilization in 1986. (OTA May draft, p. 10-24.) This would suggest there would be 6,250 potential IVF patients from this veterans population.

2. Demand for VA Infertility Treatment If Provided For All Infertile Veterans

How many of the couples that include eligible veterans want a baby and also want the infertility services to be provided by the VA? This is a complex question. Information concerning these couples and couples in the general population is limited, and there may be some important differences between the veteran group and the general population. However, this veteran group is a substantial percentage of the infertile couples in the general population; as noted above, male veterans are nearly one third of the male population 17 years old and older, and, while that may be a higher proportion of older males of the World War II era, the percentage of infertile couples would still be significant. Moreover, many of them may

already have sought infertility services in the private sector and may be adequately insured, so that convenience and other preference may lead to seeking such services from private physicians and clinics. Finally, many who are infertile may not want an infant or may not seek infertility services for other reasons. It is clear that some, but not all of the eligible veteran couples would use infertility services provided by the VA.

We assume here that, in the absence of data to the contrary, the eligible infertile couples as a group are similar to the general population in some relevant respects, such as the proportions of primary (never pregnant) infertility and secondary (with a prior pregnancy) infertility and other demand factors such as motivation to use infertility services. Survey results in 1976 and 1982 indicate that, at the time of the interview, about 55 percent of the infertile couples in the general population wanted an infant. There are significant differences between those with primary and secondary infertility in the proportions who wanted an infant and in the proportions of those who had used infertility services. Overall, however, 31 percent of the infertile couples had ever used infertility services.

(M.B. Hirsch and W.D. Mosher, Characteristics of Infertile Women in the United States and Their Use of Infertility Services," Fertility and Sterility, April, 1987.)

There is, then, a significant difference between the 55 percent who, at the time of the interview, said they wanted an infant and the 31 percent who had ever sought services. That difference could be the result of a number of factors, including disagreements between spouses, limited information and access to services, financial and insurance limitations and cultural or religious barriers. However, if the VA is to publicize and provide infertility services, some of these barriers would be reduced if not eliminated. It seems reasonable to assume, then, that the same 55 percent of the infertile couples in the general population who want an infant could be applied to the eligible veteran group, and that more than 31 percent of the eligible veteran group would use infertility services because of the lower barrier.

But how many are likely to use services provided by the VA? The upper boundary would be the 55 percent assumed to want an infant, but it is clear that some of them would not get free infertility services from the VA. Many who qualify for use of

other VA health services do not use them; they can afford or are covered for private sector services and prefer them, and many without service-connected disabilities and higher income could be required to make copayments for VA services. Some of these couples (perhaps 31 percent) may already have used private sector infertility services, where there have been recent increases in availability and insurance coverage. Those who are successful or have given up hope are not likely to seek additional services from any new source. So the potential users of VA infertility services would be the eligible infertile couples who (a) want an infant, (b) are unable or unwilling to use private but would accept public services, and (c) who wish to substitute the public sector services for the private sector ones on a free or copayment basis.

We assume here that about 5% of the eligible veterans couples will not seek infertility services, even if they want an infant. Provision of the care by the VA will not reduce fear of treatment or cultural and religious barriers completely. The median family incomes of veterans in most age groups are higher than those for the non-veteran population and higher than the ceilings for free care for nonservice-connected disability by the VA. (Veterans Administration, Annual Report, 1985.) This would

imply a copayment requirement that would reduce the cost advantage of VA services as compared to private sector services for more than half of the eligible veterans who want an infant. Moreover, unemployment rates for veterans are lower than those for the general population, especially for the younger age groups of the eligible veterans. This implies that more of the veteran population would have health insurance to cover private sector infertility services. We assume that 30 percent of the eligible infertile couples whil use private infertility services even when the VA offers such services. This is about the same percentage of the general population of infertile couples (31 percent) who had earlier reported using private sector services.

Therefore we assume the remaining 20 percent of the eligible veteran couples are likely to use the VA for those services. This would include those with service-connected disabilities discussed below. This imples that 200,000 of the estimated one million infertile veteran couples are likely to seek infertility services from an ongoing VA program. To serve those couples, 80,000 to 120,000 males and over 100,000 to 140,000 females may be expected to use infertility services beyond initial examinations, and there might be 1,250 patients for in vitro fertilization from this group.

3. Estimates of Eligibles If Infertility Treatment is Provided For Veterans With Service-Connected Disabilities Related to Infertility

The VA has identified the service-connected disabilities that are most clearly related to dysfunctions of the male and female reproductive systems and has provided a breakdown of such cases for 1985. There data appear in Table III-3. (OTA May draft, pp. 9-4 and 9-5. The age and marital characteristics are not reflected in this source. An alternative source appears to relate to the 1986 infertility-related service-connected disabilities for males 55 years old or less and for females 40 years old or less without noting marital status and with greater detail on spinal cord elements for males.) Since the marital status is not indicated in the listing of cases by disability, we assume here (as elsewhere, above in the discussion of the total veteran population) that 79 percent of male veterans and that 59 percent of female veterans are married. These assumptions would suggest that 12,522 of the males and 729 of the female veterans, or a total of 13,251, are married and meet the operational definition of infertility used in the OTA study.

These data are suggestive of the special problems of these veterans. For example, nearly 40 percent of the males were in the category of removal of testes, and an added 15 percent in the category for complete atrophy of testes, so that a procedure involving donor artificial insemination may be indicated. In addition, most of these with spinal cord injuries, about 10 percent of these veterans, may be able (with experimental techniques like electro-ejaculation being developed by the VA) to achieve parenthood with romologous artificial insemination. Though this may be true for nearly two thirds of these male veterans, it is not clear that the treatment schemes would be so limited. The spouses of these veterans may have added infertility problems, and, in some cases, in vitro fertilization may be more promising than artificial insemination. The choice of in vitro fertilization may also be relevant for the female veterans. The treatment scenario will depend on the disability of the veteran and on the infertility problems of the veteran's spouse.

In any case, some infertility services would be required for both the veterans represented in the list of disabilities and their spouses. Moreover, as noted elsewhere by OTA, (OTA May draft, p. 9-5.) there are additional categories of service-

connected disability that have clear relationships to sexual dysfunction but are not on the list. Some may be medical, such as multiple sclerosis, and other may be psychological, such as post traumatic stress disorder (PTSD). In 1985, there were 13 specialized programs for inpatient treatment of PTSD in VA medical centers, and there is a National Center for Stress Recovery at the Cleveland-Brecksville VA Medical Center. (Veterans Administration, Annual Report, 1985, p.21)

A VA survey on PTSD-related problems may indicate some dimensions on relationships to infertility; data on the survey may be available by the end of 1987. Those involved in treatment of PTSD have noted that it may be associated with stunted sexuality, partly as a result of familial and marital problems associated with PTSD behavior. Some of the PTSD patients may, in the course of protracted counseling, therapy, relaxation and rest work through stress problems and return to a more normal sex life, after they are relieved of anxiety and an inability to make close relationships. Some couples involved in PTSD may also be clinically infertile, and it may be necessary to screen such couples for medical infertility problems. In addition, the fear of birth defects of some who were exposed to Agent Orange may

create sexual or procreative dysfunction. (Dr. Thomas Murtaugh, PTSD project officer, Veterans Administration, personal communication, July, 1987.)

It is not possible to estimate the numbers with service-connected disabilities whose disabilities may be related to infertility. If the provision of infertility services is limited to those couples with service-connected disabilities related to infertility, the VA will have to designate those specific disabilities deemed to be related to infertility. It is likely that the list of such disabilities related to infertility and the number of veterans involved would grow substantially with more awareness and understanding of infertility relationships, with increases in the future numbers and proportions of younger women veterans and, when infertility services are offered by the VA, a continued tendency to try to treat all of the medical problems of patients in the system.

However, the list in Table III-3 , is the only currently available source on service-connected disabilities related to infertility that can be used to estimate the number of infertile couples that would be eligible for infertility services provided

or financed by the VA. It is reasonable to assume that all of the estimated 12,522 male and 729 female veterans who are married and have related conditions would be eligible for those services.

4. Potential Demand of Veterans with Service-Connected Disabilities

How many of the couples that include veterans with service-connected disabilities related to infertility want an infant and would therefore want the infertility services to be provided or financed by the VA? This is a complex question because of the limited information available concerning these couples and such couples in the general population. This sample of veteran couples may differ significantly from the infertile couples in the general population. More of the veterans, such as those paralyzed by spinal cord injuries, are likely to be totally disabled and may feel less able to cope with the problems of parenthood. On the other hand, if the VA were to provide or pay for infertility services for them, the veterans would not have the same financial barriers experienced by infertile couples in the general population. We assume, in the absence of data on significant differences such as proportions of primary (never

pregnant) and secondary (with a prior pregnancy) infertility, that the veteran group and the general population of infertile couples have similar motivations and demand characteristics.

Survey results in 1976 and 1982 indicate that, at the time of the interview, about 55 percent of women of infertile couples in the general population wanted an infant. About 30 percent of those couples had primary infertility, and about 70 percent of them wanted an infant. About 70 percent of the couples had secondary infertility; 48 percent of those wanted an infant. Approximately one in three (31 percent) of the infertile couples had, at some time, used infertility services; this included more than half (51 percent) of those with primary infertility and about one in six (16 percent) of those with secondary infertility. (M.B. Hirsch and W.D. Mosher, "Characteristics of Infertile Women in the United States and Their Use of Infertility Services," Fertility and Sterility, April, 1987.)

The overall percentages of those wanted infants and using services differ significantly between primary and secondary infertility. This result seems reasonable since 90 percent of those with secondary infertility have had at least one child. The proportion of all infertile women that wanted an infant, at

55 percent, was much higher than the proportion (31 percent) who had used infertility services. This difference could be the result of a number of factors, including disagreements between spouses, limited information on and access to services, financial limitations and cultural or religious barriers. However, if the VA is to publicize and to provide infertility services or financing, it seems reasonable to assume (a) that the 55 percent of the infertile couples in the general population who want an infant is about the same as the percentage of veterans with service-connected disabilities related to infertility, (b) that none of the male veterans in this group are married to females in the group, and (c) that virtually all of those would use the services provided by the VA. We therefore assume that 55 percent of the estimated 13,251 married veterans with such conditions, or 7,288 would use the infertility services.

Under these assumptions, 55 percent of the 12,522 married male veterans in the group, or 6,887, would use infertility services for males, and the same proportion of the 729 married female veterans, or 401, would use infertility services for females. Initial screening for infertility would be needed for the spouses of these veterans. Artificial insemination, GIFT or in vitro fertilization of the spouses of many of the male

veterans may be indicated for reasons noted above, and some of the spouses may also have infertility problems. Therefore it seems reasonable to assume that virtually all of the spouses of the 6,887 male veterans would make significant use of female infertility services. Since male factors are the major cause of infertility in 20 to 40 percent of infertile couples and contribute to infertility in another 20 percent (May draft, p. 9-4.) it seems reasonable to assume that 50 percent of the spouses of the female veterans in this group, or about 200, would use the male infertility services. This indicates, then, that there would be about 7,087 users of male infertility services and 7,288 users of the female infertility services.

III. Provision of Services in VA Medical Centers

There are basically two ways considered here for the direct provision of infertility services by the VA: (1) provision of services at all of the 172 medical centers, and (2) provision of services at a number of regional medical centers. Neither of these approaches is "the VA way", which has been described as starting a new service on a pilot basis at one medical center and hten, on the basis of operating experience, establishing the

service at additional locations. The pilot location is selected on the basis of demand and resident expertise. An alternative method of initiating services in the VA is to contract for external provision and to record growth in demand to a point where it is cost effective to provide the service internally. The latter has been the basis for providing mammography; by 1987, the service was provided in seven VA medical centers. (Dr. Susan Mather, Program Chief, Veterans Administration, correspondence, May, 1987)

In any case, the maximum number of locations considered here would be in the 172 medical centers; the 53 independent or satellite clinics and the independent domiciliary are not considered here. The clear advantage in having infertility treatment in all of the 172 medical centers is the availability and ease of access for infertile veteran patients who know their local medical centers and who may use them currently for other services. However, there are some disadvantages of mandating such a scheme. These include high costs of duplicating staff and facilities when local demand is uncertain and the difficulties in obtaining expert services in some locations. As opposed to certain specialities common to the medical centers (internal medicine, surgery), there are no full time gynecologists in the employ of the VA.

1. Start-up Costs

The infertility services to be provided include in vitro fertilization, artificial insemination, GIFT and others. Therefore the OTA survey of IVF/infertility centers can provide some helpful insights into the cost elements of establishing such a service. (OTA May draft, pp. 10-30 et seq.) The survey revealed that most such centers begin as adjuncts to obstetrics/gynocology departments or in major hospitals, so that much of the specialized equipment and staff may be available without being specifically dedicated to such centers. They estimated the costs of purchasing additional specialized equipment at $40,000 to $60,000.

Most of the VA medical centers are fully equipped and staffed for a broad range of general medicine and surgery and for the specialties related to care for the male veterans, such as urology. In addition, the existing laboratory equipment can provide for most standardized tests, and there is some male surgery related to infertility (e.g., penile implants). However, most female "gender specific" treatment has been contracted out, in medical sharing agreements, with Department of Defense or university hospitals nearby, where care can be supervised (charts go back and forth) and supervised by the medical center.

Some medical centers, then, may have most of the equipment required but are not likely to have all of it. For example, some may have specialized laparoscopy equipment, while others may not. None would be expanding into female infertility services from the base of a well established obstetrics/gynocology department. Therefore it is likely that the cost of the new capital equipment for the average VA medical center would be about 50 percent higher than the estimate from the OTA survey; it is estimated, then, at $60,000 to $90,000, or about $75,000. (Hugh Deery, Fiscal Officer and Acting Deputy Administrator, and Nancy Kincaid, Assistant Chief Nurse and Director of Women's Affairs, Philadelphia VA Medical Center, interviews, July, 1987.) For the 172 hospitals, then, the equipment cost would be about $12.9 million.

The infertility center or clinic could operate in the same fashion as do other specialized clinics at the medical centers, in a general clinic area of the center on a part-time basis. There is great variation in the scope of such clinics; some operate for a day or half day a week, and others operate more or less hours, depending on the demand and the availability of the specialized staff. It is reasonable to assume that, since each medical center would be opening a separate infertility clinic,

each medical center would regard it as a pilot operation by starting with a four-hour schedule once a week. Most medical centers are likely to be able to accommodate that added service without severe disruption of their current space and staff schedules for ongoing clinics and without a search within the plant for additional space. Similarly for inpatient services, operating room time and the numbers of total beds and dedicated women's beds are likely to be adequate at the outset.

Those medical centers which experience excess demand could establish waiting lists (that are not rare for infertility clinics) while planning expansion to more hours. Those with inadequate demand could reduce the length or frequency of the clinics. In either case, we assume that the initial offering of infertility services would not require capital costs beyond those for the specialized equipment for women's services and in vitro fertilization and that the male infertility services can be provided by the urology and other existing departments, including the laboratory facilities, of the medical centers.

The OTA survey of infertility clinics offering IVF reported the typical staffing patterns. (OTA May draft, p. 10-30.) These included:

1 or 2 physicians specializing in reproductive endocrinology

1 doctorate level person in reproductive biology

2-4 registered nurses

2-8 technicians

1 psychologist

The total staff rarely exceeded 20 persons, most offered microsurgery and other infertility services as well as IVF, and there was a broad range in the numbers of IVF treatment cycles, from 15 to 1000 a year. Most VA medical centers would have, in their employ or in available labor pools, the nurses, nurse practitioners, technicians and psychologist. However, at least some of the nurses, nurse practitioners, and technicians would need initial or refresher training in order to deal with general gynecology services, now rarely offered by the VA, as well as with specific infertility services like IVF. Initial staffing of infertility clinics by reassignment of current employees will not work reasonably without some such training, especially for the nurse practitioners used in VA settings to perform some services done elsewhere by physicians.

It may be possible in many cases to achieve such training for each clinic by having two nurses, two nurse practitioners and two technicians work as observer-trainees in established

gynecology departments or infertility clinics. Training of two in each group would assure staffing continuity for the clinics. This would be easiest for the medical centers with sharing agreements or academic affiliations with unversity medical schools. In 1986, 103 of the 172 medical centers had affiliations with medical schools for residency agreements and, often, for other services, and all of the medical centers are otherwise affiliated with institutions in their areas. Specific training in IVF techniques may be more difficult to arrange. In any case, the start-up costs for infertility clinics should include some costs for staff training.

We assume that most of the training costs will be for the salaries of the trainees, that nurse practitioners would require three months in order to learn and practice new techniques, and that staff nurses and technicians may require one month of training. We also assume that the average monthly salaries of the nurse practitioners would be $2,700; of nurses, $2,500, and technicians, $2,000. These average salaries would reflect the use of more experienced staff persons and the higher than national scale salaries paid in more competitive medical labor markets. Other, incidental costs of training might average about $200 per month per trainee.

These assumptions permit estimation of total start-up costs, as shown in Table III-4. In addition to the capital costs estimated at $75,000 per medical center, the training costs would be $27,000. Total start-up costs would then be $102,200 for each medical center, or $17,578,400 for all of the 172 medical centers. All of these costs, as noted above, are for providing women's infertility services not now available in most VA medical centers.

2. Continuing Costs for Staff

The continuing costs of operation would primarily be in the costs of staff and ancillary services; the costs described here make no specific allowances for space or overhead and are based on marginal costing assumptions. The physician, a gynecologist with experience or training in reproductive endocrinology and biology, would be assisted by two nurse practitioners, two staff nurses, two technicians and a psychologist-counselor. This corresponds roughly to the pattern of the OTA survey of clinics and to VA staffing patterns, and it would be subject to change to meet changes in demand and staff availability. We assume that reasonable estimates of annual salary levels of such staff would be: nurse practitioner, $32,400; staff nurse, $30,000; technician, $24,000, and psychologist, $35,000.

The VA hires physician specialists in a variety of arrangements. Some involve shared service contracts with departments of other institutions with services performed at other institutions or at the VA medical center. Others are scarce medical contracts that may be based on negotiated fees for specific services, or an hourly basis or as a percentage of the rate for a full time employee. The rates for such contracts vary significantly among different local market areas and on the basis of the contract. Since there are no full time gynecologists on the staffs of the medical centers, they are likely to be hired under such scarce medical contracts. In one such gynecologist's contract in the mid-West, fees are paid per procedure performed in a VA medical center; examples are $1,045 for a hysterectomy, $484 for a laparoscopy and $33 for a hospital visit to a patient. Another in the same region is with a medical school department and pays $150 an hour for time spent in the VA medical center. (Dorothy Kuhn, Scarce Medical Contracts Office, Veterans Administration, personal communication, July, 1987.) We assume here that a qualified gynecologist for the infertility service can be hired for $150 an hour.

The staff costs for the infertility service for women, then, can be calculated on an annualized basis as shown in Table III-5. At $150 an hour for four-hour clinics each week, the annual cost

per medical center is $31,200. For other VA employees assigned to the clinic, we assume that a half day a week is the equivalent of 10 percent of full time, so that the staff costs are estimated at 10 percent per clinic per year would then average nearly $52,000, and the total for the 172 medical centers would be nearly $9 million.

A clinic so staffed may, on the average, be able to accommodate 25 to 30 patient visits a week, so that the system of 172 medical centers may have a capacity of 4,300 to 5,160 patient visits per week. This assumes that nurse practitioners and physicians both see patients, that nurse practitioners refer some patients to the physician, that both refer patients to the psychologist, and that there are separate appointments with other departments for certain services, such as laboratory tests or X-rays, and for any inpatient procedures, such as surgery or cycles of in vitro fertilization. However, some of the patient visits may be for follow up checkups or treatment, including injections for drug therapy. (Most of the assumptions on the staffing and operation of the infertility clinics are from Nancy Kincaid, Assistant Chief Nurse and Director of Women's Affairs, Philadelphia Veterans Administration Medical Center, interview and personal communication, July, 1987.)

3. Regional Infertility Centers

Establishment of 10 regional infertility clinics at selected medical centers is a more modest, and hence more feasible venture than setting them up at all 172 medical centers. The principal disadvantage is that access to the services at 10 regional centers would be very limited as compared to providing them at all medical centers, imposing transportation and other costs to those who could get to the centers and denying the services to those who could not.

Such disadvantages may be outweighed by the advantages. Regional centers could be established on the basis of regional (local) demand factors and on the availability of expert staff. This would permit the centers to be located where there are affiliations with university medical schools and tertiary care hospitals, so that there would be no need for compromise on standards of expert service or on the staff training. There would be no unnecessary duplication of resources and staff and less risk of a level of demand that is inadequate to justify such resources at any center. Experience gained at a limited number of regional centers would be useful in the later expansion of those services, at the same and at additional centers.

We assume that setting up the regional centers would involve costs of capital, training and continuing staff on the same basis as that described above. (See Table III-4) On that basis, the capital costs for the 10 centers would be $750,000, and the training costs would be $1,022,000, for a total of $1,772,000 in start-up costs. Continuing staff costs for the 10 clinics would be about $520,000 a year. The system of 10 regional centers would could then be expected to accommodate a total of 250 to 300 patients a week at the four-hour weekly clinics, with ancillary services to be provided in appointments with other departments of the regional medical centers.

IV. Demand and Costs of Veterans Administration Infertility Centers

1. Demand, Costs and Categories of Services

The discussion in Section II estimated that, if infertility services are available for all eligible infertile veteran couples, 200,000 such couples might be expected to use VA services. If the services are only for those with service-connected disabilities related to infertility, on the other hand, an estimated total of 13,251 couples might use the services. The great difference in the number of user couples is the most important difference in demand expected under the two eligibility conditions. There are other important sources of difference in the composition of the specific services to be demanded because of the nature of these two groups. Therefore, it is reasonable to consider the demand for specific elements of service for these groups separately, Estimating the specific needs (e.g., clinic visits, surgery, IVF) is a prerequisite to an estimate of the costs of providing the services in VA clinics in this section and to estimating the costs of financing private sector care in the next section.

There appear to be no fully standardized processes or protocols for the treatment of infertility. The field is a relatively new one, especially in the treatment of male infertility, and some of the advanced techniques are also new. Moreover, the success of treatment may lie more in patient-specific than in standardized protocols, and different physicians and clinics tend to adopt different options for treatment strategies. However, the scenarios developed by OTA, along with the OTA estimates of the costs of specific procedures, can offer some insights into the likely mix of services and their costs for a group of infertile couples. (OTA May draft, pp. 10-8, 10-15, 10-41, 10-47) This method is more complex than extrapolating from the OTA estimate of total expenditures on infertility from the National Medical Care Utilization and Expenditure Survey (MNCUES) data. However, the age specifications for the veterans group (males under 55 and females under 45) differs from the OTA use of NMCUES data, which is based on the 1980 population of persons aged 15 to 44. (OTA May draft, pp. 10-48 and 10-50)

The OTA scenarios for infertility treatment relate to 100 couples beginning diagnosis together in the first stage, and with the women going into drug-oriented treatments for oligomemorrhea

in the first stage, which takes 6 to 9 months. We have allocated the elements of service in this and ensuing stages into cost categories that might apply to the VA, as shown in Table III-6. We have included a number of physician visits as clinic visits and have attributed other costs, at prices indicated by OTA surveys, into categories for drugs, laboratory services, and "other" services. The other services include ultrasound as ancillary to the clinic, special physician services such as consults and gynecological surgery and other hospital services.

Thus, in the first stage for the diagnostic elements, there would be three clinic visits (female history and physical, pelvic examination and counseling), $495 in laboratory costs that include hormone test batteries and semen analysis, and $120 in other for a male physical and history. This male physical could have been a clinic visit, but the clinic staff physician described in Section III was a gynecologist. We assume a staff physician or urologist in another clinic or department in the medical center would perform the service, just as we assume that drugs, ultrasound and laboratory services will be provided by departments of the medical center. In some instances, then, the OTA price may overstate the marginal cost of such services.

Thus, for the first stage, over 6 to 9 months, there would be an estimated 18 clinic visits and $2,785 in drugs, laboratory and other costs for all of the eligible couples. For 70 percent of the females of these couples, this would be followed over the next year by the diagnosis and evaluation procedures in the second stage, where there would be four clinic visits assumed to direct and interpret the $2,055 in laboratory and other costs. Tubal surgery and drug treatment over the next 18 months for 49 percent of the couples would require 15 visits and $6,470 in drugs and laboratory and other services in the third stage. Then 17 percent of the couples who are promising candidates for IVF are presumed to have an average of 1.6 cycles of IVF, which would require a total of 10 clinic visits and $7,040 in other costs over the final stage of the scenario. Two cycles of GIFT are considered here as an alternative to the 1.6 cycles of IVF.

All of the services of the OTA scenario are for female services for infertility after the diagnostic and counseling elements of the first stage. However, as noted above, such female factors may account for or contribute to 50 to 70 percent of infertility among couples, while male factors may contribute to or account for 40 to 60 percent. (OTA May draft, pp. 9-4 and

9-5.) The percentages of couples in the OTA scenario may still be relevant because some of the services (e.g., artificial insemination, IVF and GIFT) may involve females but may be treatments related to male causes. However, the costs of the scenaric stages may understate the costs of infertility services by omitting additional urology consults and other services for males. There are no standard protocols for such services for males. Male factors are believed to be the major causes of infertility in 20 to 40 percent of infertility and to be contributory causes in another 20 percent. Therefore, though there are no standard protocols or scenarios for male infertility services, it is reasonable to assume that 40 percent of the males may require some services beyond the initial diagnostic elements of a history and examination, semen test and counseling included in the first stage of the OTA scenario. Rather than ignore such costs, we assume here that 40 percent of the males will require an average of three clinics, two urological consultations ($150), two semen analyses ($90), other serum or hormone laboratory tests ($100), hamster-oocyte test or testicular biopsy or varicocele repair or drug therapy like clomid (average $500). The 40% of the males might then account for an additional $840. This absence of a treatment protocol precludes accurate estimates or weights, those who take clomid for brief periods will have lower

costs; while those who require surgery and artificial insemination cycles may have higher costs. Some private sector experience suggests the use of at least a separate male workup and urology consult for about 40 percent of couples, and charges are likely to exceed $700 for those needing a testicular biopsy. (Joan Fried, Clinical Coordinator, Fertility Research Foundation, New York, personal communication, July, 1987.)

The estimate of the average number of visits and other costs per couple using VA infertility services is shown in Table III-7. The overall averages are calculated by attributing the percentage of users of each stage of the OTA scenario and of the male services noted above to the estimates of the clinic visits and added dollar costs of each phase. The overall average for each user couple is estimated at 31.1 visits and $8,926. These overall averages, reflecting demand, can be related to the annual costs of VA infertility services. However, there first must be an assumption relating the overall demand by eligible infertile couples to the annual demand by eligible infertile couples to the annual demand for such couples. The OTA scenario estimates the time elapsed for each of the first three stages, and the total for those three stages is 36 to 39 months. If another year is

taken by the fourth stage IVF and GIFT processes and some extra male treatments, the process could take more than four years for couples who go through all of the stages and services. On the other hand, nearly a third would finish within one year and a half within two years. All but one out of six are likely to be done within three years. The average couple is likely to take about two years.

Therefore, the average annual demand per user couple is likely to be for about 15 visits and $4,500 in other services, or about half of the overall averages in Table III-7. This may be viewed as a very high level of user demand. The OTA scenario assumes that all who do not achieve pregnancy go on to the next stage of treatment except for 17 percent who are not deemed promising candidates and do not continue to the fourth stage of the scenario. However, many others may drop out along the way for other reasons. While provision of services by the VA may overcome some of the financial barriers noted elsewhere by OTA (OTA May draft, pp. 10-12, 10-13), many may be required to make copayments, sc that some patient costs remain. Some may become discouraged, reach cutoff ages or conditions, move to new job and home locations and discontinue treatment, experience marital

difficulties or seek adoption as an alternative to treatment. The first stage accounted for about half of the overall average of clinic visits and for about 30 percent of the other costs. If 20 percent drop out of the scenario after the first stage for reasons other than becoming pregnant, then, the overall average annual demand would fall to 13.5 visits and about $3,900 in added costs.

2. Demand, Costs and Services for All Infertile Veteran Couples

In Section II, we estimated that an ongoing VA infertility service program could serve an estimated 200,000 infertile couples. Under the assumptions noted there, and the further assumption that new cohorts of infertile couples would be added, the annual demand would be estimated at 2,700,000 clinic visits and $780,000,000 in added dollar costs for drugs, laboratory and ancillary services, consulting physicians and hospital charges. As noted above, many of the elements of dollar cost at OTA market price estimates may exceed the marginal cost of supplying those services in the VA. However, the volume of demand for some of the services may be sufficient to require the employment of

additional staff, and some would involve contract services or direct costs, such as those for drugs. And, as noted in the costing of the OTA scenario, some clinic visits were added.

However, the volume of demand estimated for exceeds the availability of services described in Section III. It was noted there that a four hour weekly clinic in all of the 172 medical centers would have the capacity to provide 4,300 to 5,160 patient visits a week. This would be 223,600 to 268,320 visits a year as the capacity; with regional demand differences, it was noted that some center clinics would operate at less than capacity while others would have waiting lists. However, this annual system capacity (for the 172 medical centers) is equal to less than 10 percent of the demand for clinic visits for the 200,000 couples. This means that the system of clinics would have to expand the capacity to meet demand or the VA would find a way to ration the services among otherwise eligible infertile veteran couples.

If the VA were to be committed to offering infertility services to all infertile veteran couples, then, there would be a need to expand the projected capacity of the weekly four hour clinics at 172 medical centers by 10 times. This could be done

by expansion of those clinics, where and as local demand warranted it, to full 40 hour a week service. This would encounter space and staff constraints at most of the medical centers. This might not alter the estimate of $17.5 million in start-up costs for the clinics noted in Table III-4, but it would increase the staffing costs after such expansion from almost $9 million noted in Table III-5 a year to about $90 million. When the annual staff costs are added to the drugs, laboratory and other costs at $780 million a year, the $870 million annual total is more than 90 percent of the OTA estimate of 1986 private sector spending on infertility service of $935 million. (OTA May draft, p. 10-16) Some of the VA services may substitute for some of the private sector services, while the rest would represent an increase in the demand related to greater supply and access and to lower financial barriers to such services. Some of those costs would be offset by copayments and insurance payments of the veterans.

If the demand is to be restricted in order to contain the budgetary pressures of such a commitment, the VA could offer the services only at 10 regional centers and use waiting lists, travel costs and other methods to reduce demand and ration

capacity output of services. The 10 regional centers could provide about 6 percent of the services estimated for a system of clinics at 172 medical centers. Start-up costs for a system of 10 regional clinics would be about $1 million. Annual staff costs would start at about $520,000 for the four hour weekly clinics, but they would rise to $5.2 million a year with expansion to 40 hours a week. Additional costs of treating patients, while operating at the full week capacity, would be about $45.5 million. The annual budget for such clinics, after start-up costs and the initial period of operation, then, would be about $50.7 million.

If there remained a long term commitment to offering these services to all infertile veteran couples, the 10 regional center could serve as pilot clinics for the expansion of those clinics and for replicating the clinics at the other 162 medical centers. Such expansion would be required in order to fill unmet demand for that commitment.

3. Demand, Costs and Services for Disabled Veterans

The obvious alternative would be to change the commitment. The VA might limit the offer of infertility services to the veterans with service-connected disabilities related to infertility. In Section II the estimate of 7,288 couples in this category likely to use the services included 6,887 male disabled veterans and 401 female disabled veterans and their spouses. But this is a special category, a population with known causes of infertility (as shown in Table III-3) for the veteran spouse of each couple and with unknown infertility related to the other spouse. Moreover, the disabilities may have prevented the usual test for infertility, a year of unprotected sexual activity.

Special care is required, therefore, in the attempt to apply the OTA scenario to the infertility treatment of this population. For the males, for example, nearly 55 percent of this group had complete atrophy or removal of the testes, conditions that would suggest the use of artificial insemination, IVF or GIFT donor sperm. For the other males, however, additional treatments to use their own sperm may be indicated. These treatments could include surgery for the 19 percent with stricture of the urethra

or removal or deformity of the penis, drug therapy for the 16 percent with partial or complete prostate removal and electro-ejaculation or similar technique for the 10.5 percent with spinal cord injuries. Though the male conditions may indicate such treatments, the spouses of these male veterans may also have infertility conditions that would require treatment along the lines suggested by the OTA scenario.

Similiarly, treatment of the 40.4 percent of the females with inflammations of the cervix, uterus or the uterine tubes and the 5.4 percent with pituitary conditions could also follow the OTA scenario. However, the 54.2 percent with atrophy or removal of both ovaries are more likely to have IVF or GIFT treatments with donor eggs and drug therapy. The male spouses of the female disabled veterans may also require infertility treatments that would start with the diagnostic elements of the first stage of the OTA scenario.

In order to estimate the demand and costs of VA provision of infertility services for these disabled veteran couples, we first assume that all of the females are likely to need services that are similar in cost and scope to those in the OTA scenario.

Though the major causes of infertility of these female veterans are known, the stages of the scenario may be needed for the diagnosis and treatment of other possible causes. The overall average of services for the OTA scenario was 29.9 visits and $8,600 in drugs, laboratory and other services (Table III-7). This included some male diagnosis which may be redundant for male veterans but is likely to be replicated for infertility treatment, as would the semen analysis and the pelvic examination for female veterans in the first stage of the infertility treatments. On the basis of the length of time for treatments and replacement cohorts for those eligible, this was estimated as an annual average demand for 15 visits and $4,300 in other services. This group would not be subject to copayment requirements and are already users of other VA services. Therefore we assume a minimal dropout rate.

The 7,288 who are then assumed to follow the OTA scenario, therefore, are likely to have a demand for 109,320 visits and $31.3 million in other services a year. There are additional costs. The OTA scenario assumes that 17 percent of the women would be in the fourth stage, to receive 1.6 cycles of IVF. However, all of the 216 female veterans with atrophy or removal

of ovaries are likely to require the fourth stage for such IVF treatment or its cost alternative, 2 cycles of GIFT. The added costs for the other 83 percent of this group of 179 women, at 10 visits and $7,040 in other services (Table III-7) would be 1,790 visits and $1.26 million, or 895 visits and $630,000 a year.

The spouses of the female veterans are here considered similar to the males of infertile couples in the general population. Therefore, for reasons noted above, we assume that 40 percent of these 401 spouses, or 160, are likely to require services beyond the diagnostic elements of the first stage of the scenario. At three visits and $840 in other services, this would be a total of 480 visits and $134,400, or at the rate of 240 visits and $67,200 a year.

Most of the services required directly for the male veterans are already provided by the VA under ongoing programs. For example, sperm counts, hormone measurements and drug administration, excisions of hydroceles and varicoceles and penile prostheses were all performed in the 1985 fiscal year, as were experimental programs in the electrical induction of ejaculation for paraplegics to treat the sexual dysfunction and infertility of paralyzed veterans. However, of 2,476 medical and

surgical procedures that could be related to infertility in fiscal 1985, only one (wedge resertion of the ovary) was a female procedure. There was no artificial insemination. (OTA May draft, pp. 9-6 and 9-8) We assume that the costs of those procedures are in current medical center budgets. However, as noted above, about 55 percent of these veterans have complete atrophy of or removal of the testes, and an additional 10.5 percent have paralysis resulting from spinal cord conditions. This 65.5 percent of the 6,887 male veterans likely to use the infertility services, then, or 4,511 veterans would require artificial insemination, IVF or GIFT procedures for their spouses. Some 17 percent of these have been allocated IVF or GIFT procedures in the fourth stage of the OTA scenario, so that the remaining 83 percent, or 3,744 would require artificial insemination of their own or donor sperm, and, if that fails, IVF or GIFT. We assume that two cycles of artificial insemination, the less costly procedure at an assumed average cost of one visit and $50 each, would be attempted. The total demand would then be for 7,488 visits and $374,400 in services, or 3,744 visits and $187,200 a year. We assume that about 25 percent of these would be successful. (OTA May draft, pp. 10-41 and 10-42) Therefore 75 percent of the 3,744, or 2,808 would

require the fourth stage of the OTA scenario, at 10 visits and $7,040 each. This would be a total of 28,080 visits and $19,768,320, or 14,040 visits and $9,884,160 a year.

The annual demand for the services to be offered to couples of veterans with service-connected disabilities related to infertility are summarized in Table III-8. In order to meet the demand for this group, the VA might expect to provide 128,329 patient visits in infertility clinics and $42.1 million in other services that are not currently offered in other programs of the medical centers.

How does this level of demand related to the capacities of the clinics described in Section III above? It was assumed that each four hour weekly clinic could supply 25 to 30 visits a week, or 1,300 to 1,560 a year. If such clinics were established in all of the 172 medical centers, then, the annual capacity would be 223,000 to 268,000 visits a year. This is about double the estimated 128,239 visits demanded by couples of veterans with service-connected disabilities related to infertility.

One way to reduce the redundancy would be to reduce the frequency of the clinics from once a week at those medical centers where demand is inadequate. If the goal is to promote

ease of access by providing clinics at all 172 medical centers, weekly clinics at 60 medical centers and monthly clinics at 112 medical centers would provide a total of 4,464 four-hour clinics a year. This is within the range of 4,275 to 5,130 clinics required to meet the demand for such patient visits. But this is also an arbitrary example. Monthly (and even weekly) sessions may not be clinically desirable for some types of treatment, and any mix that is specified a prior; may encounter inadequate demand at some medical centers and unmet demand with long waiting lists at others. The nature of the assumptions made in estimating the demand for services suggests the need for a sort of market or utilization survey in different locations before the commitment to start-up costs and continuing expenditures is to be made. As noted in Table III-4, the start-up costs for clinics at all 172 medical center would be about $17.6 million. The staffing cost for each four-hour clinic was estimated at about $1,000, or $52,000 a year for weekly clinics (Table III-5). Therefore the staffing costs of the 4,275 to 5,130 clinics a year, distributed over the 172 medical centers, would be from $4.3 to $5.1 million.

The alternative plan, as discussed in Section III, is to provide regional infertility services at 10 selected medical centers. For the veterans with service-connected disabilities

related to infertility, the selection of at least some of the 10 regional centers could be determined on the basis of the location of current treatment of such veterans, such as the existing spinal cord injury centers, where there would be both a significant demand and sources of expertise in the treatment of those disabilities. Use of regional centers would restrict access for some veterans. The start-up costs, however, would be reduced to about $1 million. The number of four-hour clinics would remain the same in order to meet estimated demand. Therefore, the annual staffing costs would remain at $4.3 to $5.1 million.

While the regional centers might start with one four-hour clinic a week, or 52 a year, they could expand up to 10 such clinics a week with growth in demand for continued operation. Thus the 10 regional centers could provide up to 5,200 four-hour clinics, a number beyong the 5,130 at the upper end of the estimated number required to meet the demand for patient services. Demand may be less for clinics in a system of regional centers than for a system of 172 centers because of the restricted access for some veterans and their spouses.

In addition to the annual costs of operating the clinics, there are the dollar costs of other services, as noted in Table III-8. The annual cost for these services, under the assumptions of two years average for treatments and cohort replacement of patients noted above, would be $46.4 to $47.2 million, or about $46.8 million. If the demand for services at the regional clinics would be about the same as that at the 172 medical centers, the annual costs would be about the same for both.

V. Veterans Administration Financing of Private Sector Infertility Services for Eligible Disabled Veterans

1. Costs of Veterans Administration Contracts for Services

It has been suggested that it would be folly for the Veterans Administration to plan to offer infertility services to meet expected demand by veteran couples in all 172 medical centers. At present only a few centers have women's clinics, and those are likely to be staffed by part-time or consultant physicians. The lack of equipment is viewed as a minor problem as compared to the need for expertise and the difficulty in recruiting 172 experts willing to work for the VA. Moreover, many of the private sector's tertiary care facilities have excess capacity and could meet the demands of couples with veterans with service-connected disabilities related to infertility. Therefore, while the "VA way" has been to begin a service program by establishing a pilot effort first, it has been suggested that contracting for services in this case would work better because it permits an assessment of demand. This was the process used for mammography, where contract services expanded to the point where it became cost-effective to provide them in seven medical

centers. (Dr. Susan Mather, Program Chief, Veterans Administration, personal communication, July 1987.)

The analysis of demand and costs of providing infertility services by VA contracts with private sector providers is similar to elements described in the final part of Section IV. The principal difference is that the use of patient visits to medical center clinics is eliminated. Therefore, the full costs of services, such as those in the OTA scenario, are reflected in Table III-9. The overall measure of the average cost per couple using the OTA scenario, at $9,762, is the average cost of the stages, weighted by the percentage of couples likely to use each stage. The same is true for the added male services for about 40 percent of the male spouses

As in Section II, we assume that 6,887 male and 401 female veterans with service-connected disabilities related to infertility are likely to be users of infertility services. We further assume that all of these couples, the spouses of the male veterans and the female veterans, are likely to be users of some of the later stages of the OTA scenario. Therefore, the total cost for the OTA scenario used in Table III-10, about $71.1

million, reflects the overall average cost for these 7,288 couples. We further assume that all of the 216 female veterans with atrophy or removal of ovaries are likely to require the IVF or GIFT services of the fourth stage of the OTA scenario. Since 17 percent use of that stage was part of the scenario (Table III-9), we assume that 83 percent of this group, or 179 women, would use those fourth stage services. The total cost for that is noted as about $1.3 million in Table III-10.

Some 40 percent of the spouses of the female veterans may need additional male services, including urology consultations. The total cost of such services is estimated at $160,000. We assume that the service for male veterans currently provided by ongoing programs in the VA medical centers will not be contracted out to private sector providers. In addition to the reasons cited in Section IV, this would interrupt the services currently received by such veterans. However, 4,511 couples, or 65.5 percent of these veterans (with atrophy or removal of testes or with spinal cord conditions) are likely to require artificial insemination, IVF or GIFT procedures. Since 17 percent are already considered as IVF or GIFT users, 83 percent, or 3,744 would first attempt the use of two cycles of artificial

insemination at $85 each, for a total of $636,000. If 25 percent of those are successful, the remaining 75 percent, or 2,808, may attempt the fourth stage of the OTA scenario, for a total cost of $20.2 million.

As a result the total cost of $93.4 million is estimated for contracting for private sector infertility services for the veterans with the disabilities listed in Table III-3. To estimate the annual costs of such contracts, two further assumptions would be that the average treatment time would be two years, for reasons noted in Section IV, and that there are cohort replacements of the veterans. The assumption of cohort replacement may depend on the designation of additional service-connected disabilities as being related to infertility as well as on added numbers of veterans with the disabilities listed in Table III-3. This would make the estimate of annual costs about half of the estimate of total costs, or about $46.7 million.

2. Contractual Coverage Under A Typical Copayment Plan

One major advantage of VA contracts with infertility centers is the ability to provide quality services without adding significantly to direct provision of care under ongoing programs.

It may be feasible to permit veterans to have a choice of private infertility centers. This could be done by financing care in an insurance type of method, with some copayment provisions that would not only help to control costs, but would also tend to limit the use of such services to those with a financial stake in them.

Typical copayment requirements in insurance plans involve three elements. The first is an initial deductible amount to be paid by the user. These amounts usually range from $0 to $250, with no copayment required for inpatient hospital services in many plans. We here assume that the deductible amount is $100, applied on an annual basis. Then the copayment of fixed percentages of costs or charges may be involved. This is often at the rate of 80 percent paid by an insurer and the remaining 20 percent paid by the patient, and we assume these percentages here. Finally, there is usually an upper limit to the out of pocket spending by the patient, usually an amount from $500 to $1,500. We assume that this limit would be $1,000 and would apply to all of the infertility services used, treating them for this purpose as a single episode of treatments related to one medical problem.

Since the total cost of contracted services was estimated at about $93.4 million, or $46.7 million a year, the average cost for the 7,288 couples, the average cost per couple is $12,810, or $6,405 a year. The $1,000 out of the pocket limit is applied on the basis of a full episode for the family, and includes the $100 deductible. Therefore, the 20 percent copayment of costs would reach the $1,000 out of the pocket limit in the first year for the average couple, and we assume that nearly all couples would reach that limit. This would have the effect, then, of making the average cost per couple to the VA equal to $11,810, or $5,905 a year. For each couple, it would be $5,405 for the first year and $6,405 for the second. This would make the total cost to the VA about $86 million, or $43 million a year.

These copayment costs are $7.3 million lower than for contracting for the services directly with infertility centers. One problem, however, is that infertility centers to provide such services may not exist in adequate numbers unless the VA establishes new clinics. Another is that some of the families may not have the $1,000 required to make their copayments. These problems, then, are the tradeoffs made in this plan that would give the veteran who has $1,000 more choice of infertility service sources if they are available.

3. One-time, Lump Sum Grants

One way to avoid some of the problems of an insurance type of copayment plan is to provide eligible veterans with one-time lump sum grants in a standard amount, based on the average cost of infertility treatment. This would permit the average eligible veteran to go beyond the local area of residence for treatment and to avoid concern about the $1,000 copayment. The lump sum grant under these conditions would be $12,810, which was the average cost per couple for contracted services. The total cost to the VA for providing for infertility services this way would be the same as the total cost for provided contractual services, about $93.4 million for the currently disabled veterans noted in Table III-3, or about $46.7 million a year with the assumption of replacement cohorts of these infertile veterans couples.

However, an equity problem would arise under this scheme. For the veteran couple who would require less than the average amount of services, some of the payment might constitute a bonus for the infertility condition. Others who require more than the average amount of services may be unable to finance the cost of

needed services. Similarly, the prices or fees for the components of the OTA scenario and other specific infertility services may vary substantially. OTA has noted a substantial range of costs around the median levels found in their survey of clinics and from other sources (OTA May draft, Table 10-1, p. 10-40). Those who live in the areas with higher costs may be unable to pay for needed services, while those in lower cost areas may be able to finance more services for less.

The VA does pay standard amounts for the different levels of disability compensation and for pensions, and these amounts do go to veterans in areas that have varying costs of living. For medical services, on the other hand, the VA has different staff pay levels and other costs for medical centers in areas with more or less competitive markets for medical services. While there are different costs for patient services in the 172 medical centers, then, the veterans in those medical centers are not likely to get less services than they need in the more costly ones or more than they need because they are in the less costly ones.

The payment of one-time lump sum grants in a standard amount, then, is consistent with the payment of standard amounts of compensation or pension benefits. It is not, on the other

hand, consistent with the way the VA has provided medical services.

VI. Caveats, Comparisons and Conclusions

1. Caveats

The critical assumptions used in the preparation of the cost estimates have been made explicit, either at the outset or prior to making those assumptions operational in the estimating process. Some of the assumptions are rooted in scientific studies, such as the analyses by others of surveys of family growth and of infertility centers. There is, then, some authority for those assumptions that include proportions related to infertility or the desire of infertile couples to have an infant. However, those data often relate to other populations and are assumed here to be applicable to the veteran populations of interest. While there may be reasonable correspondence between the general population in an age group and the overall veteran population, there is reason for concern about the applicability to a group of disabled veterans with specific disabilities.

Many of the other assumptions rest on more fragile bases. Some major examples are:

a. The availability of adequate resources to establish infertility clinic at VA medical centers is assumed. There may be no great problems in getting the equipment needed. But we have been warned that there may be a significant problem in attracting sufficient numbers of those with the necessary expertise to operate those clinics, and there may also be problems in the training required for the nurse practitioners, nurses and technicians. This raises some serious questions of feasibility of this way to provide services for all infertile veteran couples. There are similar questions of the feasibility for private sector provision of the services required, like in vitro fertilization, in some areas.

b. The OTA scenario of infertility services (OTA May draft, Chapter 10) has been used to make assumptions about the volume, nature and cost of many of the infertility services. This was not the reason for the development of the OTA scenario. The development of that scenario carried some warnings about the need for patient-specific protocols and about the absence of standardized sets of services

because of variations among providers. The need for some basis for estimating the services required led to assuming the applicability of the scenario to the veteran populations and the further presumption of added male infertility services.

c. Estimate of annual or continuing costs of provision or financing of the services have been based on the assumptions that about half of the population would be treated each year (because treatment may, on the average, require two years) and that there will be cohort replacement of those in treatment. This combination of assumptions rests partly on the OTA scenario and partily on general projections of increases both in the prevalence of infertility and increased rates of use of infertility services. The results may well be to overstate the costs in the absence of such cohort replacement.

d. The assumption of infertility treatment for couples is one that makes sense, clinically. The VA has provided some care for non-veterans and has financed care for the dependents of some through CHAMPVA, for dependents of totally disabled veterans. Some may object to the liability

for the scope of treatment here considered for non-veteran spouses (OTA May draft, pp. 9-12 and 9-15). That treatment accounts for a major proportion of the estimated costs.

This attempt to estimate costs required these and other important assumptions. But making the assumptions explicit does not make them realistic. They were made in the absence of relevant experience and data for these populations. There was a great effort to make them plausible and to expose them for evaluation. The effects of these assumptions on the estimates are likely to be far greater than any arithmetic errors.

2. Comparisons

The cost estimates reported above are summarized in Table III-11. If the VA is to open infertility clinics at all 172 medical centers, the estimate of start-up costs is $17.5 million. This would be reduced to about $1 million if the clinics were to be established on a regional basis at 10 medical centers. These estimates would be about the same for the provision of services to all infertile couples with veterans or only to those with veterans who have service-connected disabilities related to infertility.

The annual costs of providing infertility services are based upon the costs of staffing the clinics and the costs of other services at market rates reported by the OTA (OTA May draft, Tables 10-1 and 10-3). These market rates may be higher than the costs of providing drugs, laboratory analyses and other ancillary services in the medical centers. Some clinic visits have been added to the physician office visits specified in the OTA scenario, and some male services have also been added.

If the services are to be provided for all infertile veterans under the assumptions described in the sections above, annual costs for clinics in the 172 medical centers are estimated at $870 million. If the clinics are restricted to 10 regional medical centers, clinic capacities might limit annual costs to about $50.7 million and would fail to meet the estimated demand for services. However, waiting lists and a commitment to meet demand could lead to expansion of the system of clinics and to the annual costs of about $870 million.

The provision of infertility clinic and added services could be limited to couples with veterans who have service-connected disabilities related to infertility. In that case, the annual costs are estimated at $46.8 million. They would be about the

same in 10 regional or all 172 medical centers. The regional centers could expand the amount of clinic time to the point where capacity could accommodate expected demand for this group.

For these disabled veterans, three alternatives to operation of VA infertility clinics were considered. Contracting for private sector provision of the services and lump payments to veterans at the average cost of such services had the same estimated annual costs, $46.7 million. This is virtually the same as the estimate for the combination of the costs of staffing VA clinics and the provision of other services at market prices. This is not surprising, for two reasons: (1) the model that provided for the clinics also provided for more visits than were prescribed in the OTA scenario, and (2) most of the costs in both cases were for other services and drugs priced at market rates.

The lowest cost estimate, at $43 million, was for the third alternative, financing private sector services under a typical copayment plan. The copayment plan would require about $1,000 in out of pocket expenses from the average couple receiving treatment. This would thus reduce the cost to the VA by about

$7.3 million. This and other estimates of alternatives assume (and do not estimate the costs of) continuing services offered under ongoing programs.

3. Conclusions

At this time (July, 1987) there were no other estimates of the costs of provision or financing of infertility services by the VA. One bill in the current Congress would call for some of these services, but no cost estimates had yet been prepared by the Congressional Budget Office. (Barbara Marters, staff member, Senate Veterans Affairs Committee, personal communication, July, 1987.) The Committee had no internal data on costs, but the view apparently was that they would not require a "significant" addition to the VA appropriation.

It is not clear that the services envisioned by the Senate Committee were related directly to the assumptions made for this report or to the alternatives for treatment specified by the OTA. However, those alternatives permit some comparisons of costs and of other conditions. If the VA does provide clinic services for infertility, there would be easier access to more services than

might be the case for contracted services. The establishment of such clinics would also be consistent with other attempts to open gynecology services or women's clinics in the medical centers. However, even with those clinics, many services would be contracted or purchased outside the system.

Contracting out for the services for eligible disabled veterans would involve estimated costs that would be similar to the costs with clinics in the medical centers. Contracting for the services would cost the same amount as would lump sum grants at the level of the average cost, and it would cost more than use of a copayment plan. However, contracting for the services would avoid some of the equity problems discussed above for those methods. The advantage of all three of these alternatives is that they avoid conflicts concerning the scope of services to be offered to non-veterans. All of the estimates include the costs of treating non-veteran spouses as the largest component in each of the estimates.

Finally, it should be noted that these are not mutually exclusive approaches. If the VA decides to offer infertility services to non-veteran spouses, it could offer them to the

spouses of veterans with service-connected disabilities that relate to infertility. These veterans are currently being treated by or are eligible for the services of the VA. As demand for the services that are contracted out grows, clinics may be opened at medical centers where this would be cost-effective. Opening such clinics could lead to a system of clinics where the demand would be adequate. Success in offering such services to these disabled veteran couples could lead to consideration of similar programs for other veteran couples. This incremental approach would permit different aspects of these alternatives for different areas.

Table III-1

Estimated Number of Veterans Living in the United States and Puerto Rico by Age and Sex, 1985 1/ (in thousands)

	Total	Female	Male
All Ages	27,839	1,172	26,667
under 20	*	1.3	*
20-24	387	52	335
25-29	1,343	140	1,203
30-34	1,839	133	1,706
35-39	3,485	98	3,387
40-44	2,689	72	2,617
45-49	2,458	61	2,397
50-54	3,133	80	3,053
55-59	3,587	76	3,511
60-64	3,880	190	3,690
65-69	2,724	109	2,615
70-74	1,260	66	1,194
75-79	600	45	555
85 and older	249	21	228

Sources: (1) Veterans Administration, Annual Report, 1985, p. 163; (2) Veterans Administration, The Female Veterans Population, 1983, p. 13.

1/ There is a difference between sources for the number under the age 20.

The estimate for males is the result of substracting the female (Source 2) from the total (Source 1). The sources used different bases and methods for deriving estimates.

*Less than 0.5 thousand

Table III-2

Estimates of Eligible Cases If Veterans Administration Provided Infertility Services for All Infertile Veterans Couples (millions)

	Male	Female	Total
Under 55 years old	14.7		
Married (79%)	11.6		
Under 45 years old		.496	
Married (59%)		.293	
Married, with female 1/ spouse under 45 years old		11.9	
Total Infertile Couples 1/			1.0
Estimated Patients Eligible	.4-.6	.5-.7	.9-1.3
IVF Patients Eligible		.00625	

Sources: Veterans Administration, Annual Report, 1985, The Female Veteran Population, 1983, Survey of Female Veterans, 1985; Mosher, W.D. and Pratt, W. F. "Fecuncity and Infertility in the United States, 1965-82," NCHS Advance Data, No. 104, February 11, 1985, and OTA May draft.

1/ Assumes 170 veteran intermarriage, male veterans under 55 years old are married to women under 45 years old, and 8.4 percent infertility prevalence rate.

Table III-3

Veterans with Service-Connected Disabilities Related to Infertility, by Type of Disability, 1985

Male	
Stricture of urethra	2,459
Removal of penis	68
Deformity of penis	436
Complete atrophy of testes	2,414
Removal of testes	6,268
Partial or complete removal of prostate	2,546
Spinal cord condition	1,660
Total Male	15,851
Female	
Inflammation of the cervix	283
Inflammation of the urethra	65
Inflammation of the uterine tubes	151
Removal of the ovaries	664
Atrophy of both ovaries	6
Pituitary condition	67
Total Female	1,236
TOTAL	17,087

Source: Veterans Administration (See May draft, pp. 9-4 and 9-5. See also list for 1986 on somewhat different bases from Dr. Susan Mather.)

Table III-4

Estimates of Start-up Costs for Veterans Administration Infertility Services

	Per Clinic	Total (172 medical centers)
Capital Equipment	$ 75,000	$ 12,900,000
Training Cost		
Salaries:		
2 Nurse Practitioners 1/	16,200	2,786,400
2 Staff Nurses 2/	5,000	860,000
2 Technicians 3/	4,000	688,000
Other Costs 4/	2,000	344,000
Total Training Costs	27,200	4,678,400
TOTAL	$102,200	$17,578,400

1/ Assumes 3 months at $2,700 per month salary, each

2/ Assumes 1 month at $2,500 per month salary, each

3/ Assumes 1 month at $2,000 per month salary, each

4/ Assumes $200 per month per person

Table III-5

Estimates of Annual Continuing Costs for Veterans Administration Infertility Services

	Per Clinic	Total (172 medical centers)
Clinic Costs - Staff		
1 Gynecologist/ Endocrinologist 1/	$ 31,200	$ 5,366,400
2 Nurse Practitioner 2/	6,480	1,114,560
2 Staff Nurses 3/	6,000	1,032,000
2 Technicians 4/	4,800	825,600
1 Psychologist 5/	3,500	602,000
TOTAL	$51,980	$8,940,560

1/ At $150 per hour for 4 hours a week

2/ At 10% of $32,400 per year

3/ At 10% of $30,000 per year

4/ At 10% of $24,000 per year

5/ At 10% of $35,000 per year

Table III-6

Allocation of Services and Costs of OTA Scenarios
for Veterans Administration Services 1/

	Clinic 2/ Visits (Number)	Drugs ($)	Laboratory ($)	Other 3/ ($)	TOTAL ($)
STAGE I (100%)					
Diagnostic	3		495	120	615
Drug Treatments	15	690	830	650	2,170
	18	690	1,325	770	2,785
STAGE II (70%)					
Diagnosis and Evaluation	4		250	1,850	2,055
STAGE III (49%)					
Tubal Surgery and Drug Treatment	15	690	830	4,950	6,470
STAGE IV (17%)					
IVF per Cycle	6	500	550	3,350	4,400
For 1.6 Cycles Average 4/	10	800	880	5,360	7,040
	16	1,300	1,430	8,710	11,440

1/ All drugs and other services were priced as in OTA listings per patient except for elements assumed to be in clinic visits. (OTA May draft, pp. 10-39 through 10-45.)

2/ Four clinic visits were added in Stage II and in Stage IV to monitor treatment.

3/ Includes ultrasound, urology and other consults, gynecological surgery and hospital charges.

4/ Two cycles of GIFT are assumed as substitutes, in cost terms, for 1.6 IVF cycles.

TABLE III - 7

Estimates of Clinic Visits and Added Dollar Costs per Couple Using Veterans Administration Infertility Services by OTA Scenario Stage and for Male Services.

		Per User at Each Stage [1]		Overall Average Per User Couple [2]	
	Percent of Users	Clinic Visits	Added Dollar Costs	Clinic Visits	Added Dollar Costs
Stage I	100	18	$ 2,785	18	$ 2,795
Stage II	70	4	2,055	2.8	1,438
Stage III	49	15	6,470	7.4	3,170
Stage IV	17	10	7,040	1.7	1,197
				29.9	8,600
Other Male Services	40	3	840	1.2	336
Total				31.1	$ 8,936

1/ See Table III-6

2/ The percentages in the first column multiplied by the data in the second and third columns.

Table III-8

Estimated Annual Demand for Veterans Administration Infertility Services to be Offered to Couples of Veterans with Service-Connected Disabilities Related to Infertility

Couples/Persons	Services	Annual	
		Clinic Visits	Dollar Value Other Services
7,288	OTA Scenario	109,320	$31,338,400
179 2/	Fourth Stage, scenario	895	630,080
160 3/	Added male infertility services	240	67,200
3,744 4/	Artificial insemination	3,744	187,200
2,808 5/	Fourth Stage, scenario	14,040	9,884,160
TOTAL		128,239	$42,107,040

1/ Includes female veterans and spouses of male veterans.

2/ Includes 83 percent of 216 female veterans with atrophy or removal of both ovaries. Costs of the other 17 percent are included above.

3/ Includes 40 percent of spouses of 401 female veterans assumed to require added infertility services.

4/ Includes 83 percent of couples with male veterans with spinal cord injury or complete atrophy or removal of testes.

5/ Includes 75 percent of couples for whom artificial insemination failed to achieve pregnancy.

Table III-9

Estimate of Costs Per Couple for Use of the OTA Scenario of Infertility Services and of Other Male Services

	Percent of Users 1/	Cost Per User at Each Stage 1/	Overall Average Cost Per User Couple
Stage I	100	$ 3,630	$ 3,630
Stage II	70	2,055	1,439
Stage III	49	7,080	3,469
Stage IV	17	7,200	1,224
TOTAL			$ 9,762
Other Male Services	40	1,000	400
TOTAL			$10,162

1/ See OTA May draft, Table 10-4

Table III-10

Estimated Demand and Costs of Private Infertility Services for Couples of Veterans with Service-Connected Disabilities Related to Infertility

Couples/ Persons 1/	Services	Service Costs 2/	Total Cost (000)
7,288	OTA Scenario	$ 9,762	$ 71,145
179	Fourth stage, scenario	7,200	1,289
160	Added male services	1,000	160
3,744	Artificial insemination	85	636
2,808	Fourth stage, scenario	7,200	20,218
TOTAL			$ 93,358

1/ See notes to Table III-8.

2/ See Table III-9, OTA May draft, Table 10-1 and text.

Table III-11

Estimated Costs of Alternatives to Provide Infertility Services for Veterans (millions of dollars)

	Start-up Costs	All Infertile Veterans	Disabled Veterans 1/
1. With Services at VA clinics			
VA clinics, 172 medical centers	17.5	870.0	46.8
VA clinics, 10 medical centers	1.0	50.7 2/	46.8
2. With funding for private services 3/			
Contract services			46.7
Copay plan			43.0
Lump sum payment			46.7

1/ For couples with veterans with service-connected disabilities related to infertility.

2/ Subject to rise to $870 million if demand is to be met by expansion of the system.

3/ Assumes that services currently provided for disabled veterans would continue.

EXPENDITURES ON INFERTILITY TREATMENT

Final Report to:

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EXECUTIVE SUMMARY

Over the last decade infertility services have grown in scope, sophistication, and effectiveness. The demand for infertility services has increased as well, to a point where between 300,000 and one million couples in the United States seek infertility treatment services annually. Overall, doctors report that 50 percent of infertile couples that seek treatment are able to have a baby.

An examination of U.S. expenditures on infertility treatment produced the following key findings:

- Total Expenditures on Infertility Services. Using data from the National Medical Care Utilization and Expenditures Survey of 1980, we estimated that total infertility expenditures in 1986 were $935 million. Of that amount, about $85 million was spent on in vitro fertilization (IVF). The remaining $850 million was spent on non-IVF infertility diagnostic and treatment services.

- Costs of Infertility Services to Couples. Costs to individual couples of infertility treatment are widely variable, depending on the severity of the infertility problem. Typically, a full workup of diagnostic tests can cost up to $2500-3000, although many couples do not need anywhere near that investment. In addition to medical costs, couples often spend considerable money on travel, lost time from work, and hotel accomodations.

* * DO NOT QUOTE OR CITE * *

- Choices of Reproductive Services. Infertility treatment represents only one of a number of options for achieving parenthood. Other options that are weighed by infertile couples side by side with medical treatment include adoption, embryo transfer, and surrogacy. For couples with serious infertility problems, decisions on which option to follow may need to be made at several different points over an extended period of time. As a first step in investigating the economics of the choice of reproductive services, we examined four scenarios representing female infertility treatments. Medical costs for each of the four scenarios ranged from $2055 and $7200. Viewed together as a four-stage, worst-case treatment process, a couple entering the process would face a 70 percent chance of achieving pregnancy, and could expect to pay $13,900 to achieve the pregnancy.

- Coverage by Third-Party Reimbursers. Private insurance is estimated to cover about 70 percent of infertility expenditures. Couples pay out-of-pocket about 20 percent of the costs of infertility diagnosis and treatment, while other sources (such as Medicaid) account for the remaining 8 percent of costs. For IVF-related treatment, although almost all health insurance plans have specifically excluded coverage until very recently, our survey of IVF clinics reveals fairly widespread insurance reimbursement of IVF components for the current patient population.

- Insurance Perspectives on IVF. IVF is considered to be a very expensive item for insurance companies, both because individual components are expensive, and because there is no defined upper limit on the number of times IVF can be undertaken. Insurance companies have therefore been reluctant to underwrite such a large potential liability without placing restrictions on the number of procedures covered.

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Nevertheless, our survey of IVF centers found that to date, the centers have been experiencing an average ratio of 1.6 IVF cycles per patient. While this is probably a low estimate since many of the IVF centers are relatively new, it does suggest that insurance company fears of unlimited IVF cycles per patient may be unwarranted.

- Access to infertility treatment. For the initial medical consultation on an infertility problem, couples are likely to seek the advice of their gynecologist or urologist. Most ob/gyns and urologists provide at least basic infertility diagnostic and treatment services. If the problem is serious enough to warrant referral to an infertility specialist, access to such specialized care is likely to be reduced. Sophisticated infertility care is generally localized in urban centers. Innovative, experimental procedures for "harder" cases of infertility are more likely to be available at universities and medical centers. Access to specialized infertility treatment is a function of costs and insurance coverage for various procedures.

At present, infertility treatment accounts for close to $1 billion in annual expenditures and perhaps 5 percent of the babies born annually in the United States (assuming that 150,000 to 200,000 babies are born with the aid of infertility services, out of approximately 3.7 million babies born annually). While the contribution of infertility services to the total picture is still low, there is probably good reason to expect that contribution to rise closer to 10 percent in coming years, making infertility services a focal point of continuing interest.

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1. INTRODUCTION

Over the last decade infertility has become the subject of increasing attention. As of 1982, between 8 and 14 percent of couples were classified as infertile. As many as one million couples in the United States may be seeking infertility treatment services annually. Factors contributing to a growing demand for infertility services include:

- higher infertility rates among certain subgroups;
- greater numbers of physicians offering infertility services;
- fewer adoptable babies;
- delayed childbearing by women to ages where infertility rates are higher;
- new reproductive techniques; and
- heightened public awareness of the possibility and availability of help.

With advances in reproductive technologies, couples seeking assistance are becoming increasingly successful in obtaining help. Overall, doctors report that 50 percent of infertile couples that seek treatment are able to have a baby.

1.1 PURPOSE AND CONTEXT OF THIS REPORT

This report examines the current state of affairs in infertility-related services from the point of view of costs, affordability, and insurance coverage. As these services are adapted and refined, and as infertility treatment centers proliferate, questions arise about the costs of the services, the recipients of treatment, and the effectiveness of the services. In this report, we compile available information and analyze new data sources in order to answer such questions as:

- How widespread is access to infertility treatment for various types of infertile couples? Does access depend on income,

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geographic location, or other factors, or are treatment services universally available?

- How much do the various reproductive technologies cost for typical courses of treatment?

- How effective are the different infertility treatments? Do certain types of infertility treatments or centers have better success records than others, and if so, can we correlate these success rates with identifiable factors?

- How cost-effective are the various infertility options? That is, how much does each treatment option cost compared to the likelihood of producing a baby?

While the focus of this report is on infertility treatment services, it is important to see these services as part of the larger context of the demand for and supply of reproductive services. Infertility treatment represents one use of the new set of reproductive technologies that have emerged over the last decade. These reproductive technologies (such as artificial insemination, in vitro fertilization, fertility drugs, etc.) are also available to meet the demands of other groups of society who are not necessarily infertile. Thus, one may speak of a larger, societal demand for convenient, healthy babies.

Healthy babies may be sought through the new reproductive technologies by couples who are fertile but where one or both partners have a genetically transmissible disorder (including Rh-factor incompatibility, cystic fibrosis, diabetes, hemophilia, Huntington's disease, muscular dystrophy, and Tay-Sachs disease). Increasingly, more "convenient" alternatives to carrying a fetus to term are becoming available, both technologically through improved incubation methods, and organizationally, with wider use of surrogate mothers. The new reproductive techniques may come to be sought by women who would like children but are unwilling or unable to carry a fetus to term, and also by single individuals who do not have partners.

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In this report, however, our primary focus is on infertile couples whose motive in seeking assistance is their inability to conceive a baby without such assistance.

Just as the "demand" side of the picture is larger than infertility alone, the "supply" side also extends beyond traditional, medical infertility treatment services or reproductive technologies. In seeking to have a baby, infertile couples may begin by attempting medical or behavioral "fixes" so that they can have their own baby. Should these attempts fail, they may consider methods by which they can have a baby that is the genetic product of at least one member of the couple (i.e., artifical insemination by donor, embryo transfer, or surrogate motherhood), or they may consider adoption. In comparing the costs and availability of assistance for infertile couples, it is important to keep in mind the widening range of alternatives that infertile couples face.

This report primarily focuses on the demand and supply of services in the United States. It should be recognized, however, that a strong international component exists in all aspects of infertility. Just as organs (and, for that matter, fetal tissue) are transplanted across countries, babies too are transferred through adoption, surrogacy, and other contractual arrangements from one country to another. In the aftermath of the U.S. Government's 1975 moratorium on federal funding for research on human embryos, much path-breaking work is being done at infertility centers in other countries. Despite the important international implications of much of the discussion here, a full treatment of the subject is beyond the scope of this report.

1.2 DEFINING INFERTILITY

What is Infertility?

Infertility is customarily defined as the inability of a couple to conceive a child after one year of unprotected intercourse, where neither

partner is surgically sterile. (Some physicians shorten the time period to six months where the female member of a couple is over 35.) An alternative definition specifies that the couple in question must be continuously married during the one year time period.

This approach to defining infertility is designed to center on the population most likely to make the most use of infertility services. It does not, however, define the total population that makes use of infertility-related services, nor certain population segments that are likely to make use of the new reproductive technologies in the future.

For example, there are couples in which one or both partners have been voluntarily surgically sterilized, but who now wish to conceive a child. To the extent that these couples seek surgical treatment (such as a reversal of a vasectomy) for purposes of assisting in conception, they may be considered part of the population seeking reproductive services. Certain women with impaired fecundity could conceive but have been told by their doctors that they would endanger their own or the baby's life if they carried it to term. These women now, and increasingly in the future, may be candidates for new reproductive techniques.

To a large extent, one's definition of infertility depends on the purpose of the definition. For this report, we use the following concepts to define the populations of concern:

- The population of infertile persons is limited to married couples who have not conceived after a year of unprotected intercourse, where neither partner is surgically sterile.

- The population with impaired fecundity includes infertile persons as well as:

  -- single individuals and unmarried couples who require reproductive services in order to conceive

* * DO NOT QUOTE OR CITE * *

-- persons who could conceive but cannot or should not carry a baby to term.

- The population seeking reproductive services includes some percentage of persons with impaired fecundity, as well as some percentage of:

  -- the fecund population (persons who conceived or will conceive within one year of trying)
  -- persons seeking to reverse sterility.

What is the Magnitude of the Problem?

In this subsection, we provide background data on the size of the population in each of the three categories defined above. The primary source of data on these statistics is the 1982 National Survey of Family Growth (NSFG, Cycle III), conducted by the National Center for Health Statistics. This survey estimates the fecundity status and need for infertility services of all women aged 15-44 in the coterminous U.S. (i.e., 54,099,000 women). The survey sample consisted of 7,969 women aged 15-44 who were interviewed in their own homes by professional female interviewers (31). (This sample included 4,577 white, 3,201 black, and 191 women of other races; by marital status, 3,300 were never married; 3,500 were married at the time; and 1,100 had previously been married.)

In order to estimate fecundity status, each woman interviewed was asked a series of questions, including the following:

"As far as you know, is it possible or impossible for you... to get pregnant (again)?"

"As far as you know, is there any problem or difficulty for you ... to conceive or deliver a(nother) baby?"

* * DO NOT QUOTE OR CITE * *

Note that although the respondents were all female, the survey and the questions asked were designed to obtain information on the infertility of both members of a couple. In general, males and females appear to account for roughly equal proportions of infertility (30 to 40 percent) with an additional 20 percent of infertility arising from both parties together, and perhaps 10 to 15 percent of infertility still unexplainable. (Unexplained infertility is down from 40 percent just a decade ago.)

Based on their answers to the two questions shown above, survey respondents were classified into three major groups: (1) surgically sterile (impossible to have a baby); (2) impaired fecundity (nonsurgically sterile or difficult or dangerous to have a baby); and (3) fecund (no known physical problem)(28).

Number of Infertile Couples. Among the 28.2 million currently-married couples in 1982, 2.4 million (8.4 percent or one in twelve) were considered infertile. (The figure of 14 percent, or one in seven couples, is also sometimes cited. It refers to the percent infertile couples when surgically sterile couples are excluded from the denominator.) Exhibit 1-1 shows the proportions of currently married couples with wives of childbearing age (15 to 44) by fecundity and infertility status.

Overall infertility rates have remained largely stable over the last two decades. Excluding the surgically sterile, the 14 percent infertility rate observed in married couples remained unchanged between 1965 and 1982. However, underlying this overall stability were significant changes in fertility rates among subgroups of the population as well as changes in the composition of the population:

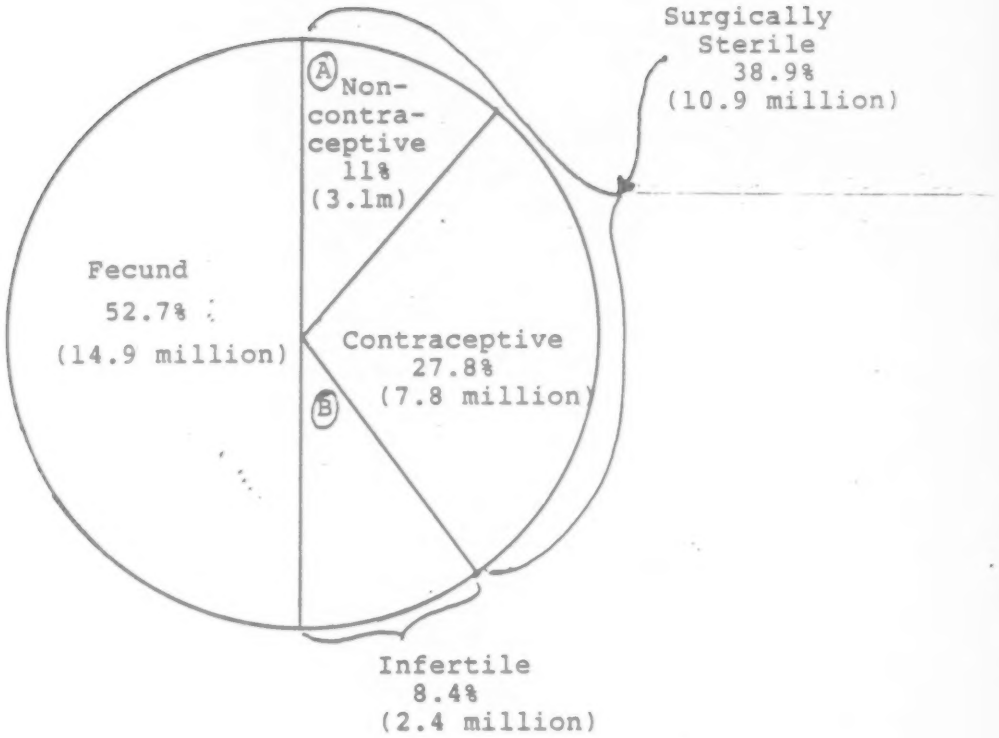
- Among couples with wives aged 20-24, the infertility rate tripled from 3.6 percent to 10.6 percent in that time period.

- Offsetting this rise was a decline in the percentage of infertile women aged 30-44, as a result of (probably contraceptive) surgical sterilizations. (31)

* * DO NOT QUOTE OR CITE * *

EXHIBIT 1-1

FECUNDITY STATUS,
CURRENTLY-MARRIED WOMEN (28.2 million), AGED 15-44, 1982



Source: see reference 28.

* * DO NOT QUOTE OR CITE * *

Number of People with Impaired Fecundity. Among all 54.1 million women aged 15-44, 8.2 percent, or 4.4 million women are classified as having impaired fecundity. Adding together the categories of surgically sterile and impaired fecundity, a total of one-third of all women of childbearing age in 1982 were either sterile or had some childbearing impediment. See Exhibit 1-2.

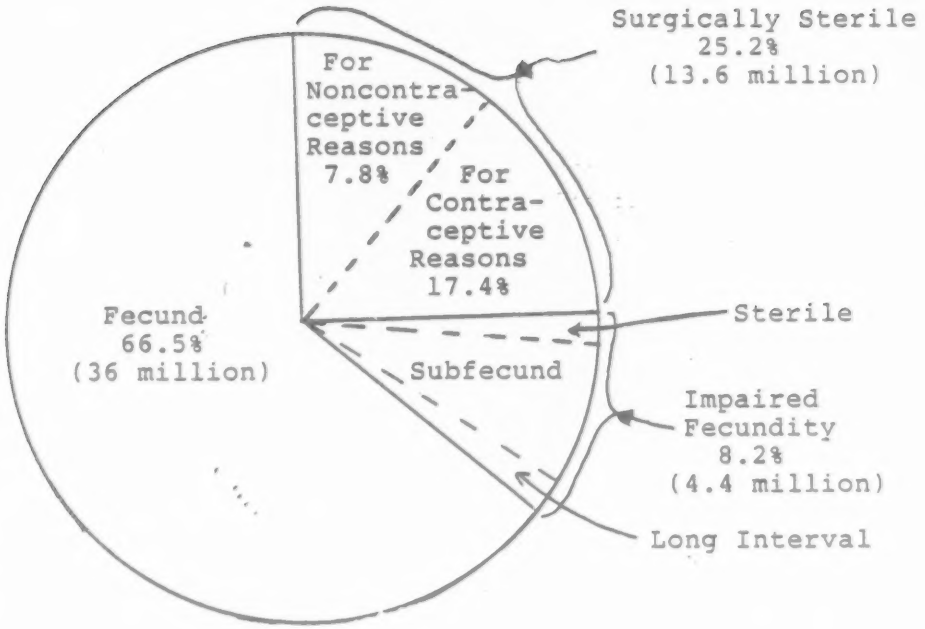
Number of People Seeking Reproductive Services. Any individual or couple could potentially seek reproductive services; and indeed, we know that some couples who do not meet (or no longer meet) the definition of infertile or impaired fecundity have sought infertility-related services at some point in the past. Nevertheless, the usual seekers of infertility-related services are those who (a) want a baby; and (b) have some impediment to conceiving or carrying a baby. Two estimates based on the NSFG results are presented here. The first represents the number of ever-married couples who reported that they sought infertility-related services in the year prior to the survey. The second estimate considers the number of women or couples who fit the two criteria above and therefore represent the potential demand for reproductive services.

(1) About 1 million ever-married women reported that they or their husbands had infertility visits in the 12-month period before the National Survey of Family Growth was conducted in 1982. Respondents were asked whether they or their spouses "had ever been to a doctor or clinic to talk about ways to help you become pregnant." As of 1982, about 6.3 million women (12 percent of all women aged 15-44 or 18 percent of ever-married women) reported that they or their husband had ever used infertility services. About 1.9 million women had infertility visits in the 3 year period between 1979 and 1982 (20). On average, 45 percent of infertile women seek treatment services (19).

* * DO NOT QUOTE OR CITE * *

EXHIBIT 1-2

FECUNDITY STATUS,
ALL WOMEN (54.1 million), AGED 15-44, 1982



Source: See reference 28.

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(2) Another use of the NSFG results was made by The Alan Guttmacher Institute, which classified women by fecundity status, desire for children, and willingness to undergo surgical procedures to reverse sterility (21). The classification is shown graphically in Exhibit 1-3. The exhibit shows that an estimated 2.4 million women with known impairments of fecundity want children and have possibly treatable impairments (i.e., they are not menopausal, not surgically sterile, and do not consider it either difficult to dangerous to carry a fetus to term) (21).

An additional 882,000 couples are candidates for microsurgery for the purpose of reversing surgical sterility. These are couples who want children (or more children), and are willing to undergo the necessary surgery, thus supplementing the potential demand for reproductive services. The final tally for the total potential demand for reproductive services (excluding fecund couples) is 3.3 million couples.

Most of the data presented so far represents prevalence data (e.g., the number of persons who are infertile at a point in time, 1982). We know, however, that each year new cases of infertility are discovered. To estimate the incidence of new cases of infertility, Cooper (10) undertook an innovative analysis, combining data from the National Ambulatory Medical Survey (NAMCES) (showing 1.1 million office visits for infertility in the two years 1980-1981) and other information (such as the number of Clomid prescriptions). Cooper estimates the number of new infertility cases per year to be between 111,200 and 161,240, as a lower bound, conservative estimate. She further deduces that the number of patients receiving treatment for infertility is between 200,000 and 300,000 per year, for the following disorders:

1.	Ovulatory Disorders	120,000 patients
2.	Endometriosis	30,000 patients
3.	Tubal Disorders	20,000-40,000 patients
4.	Seminal Factors	20,000-45,000 patients

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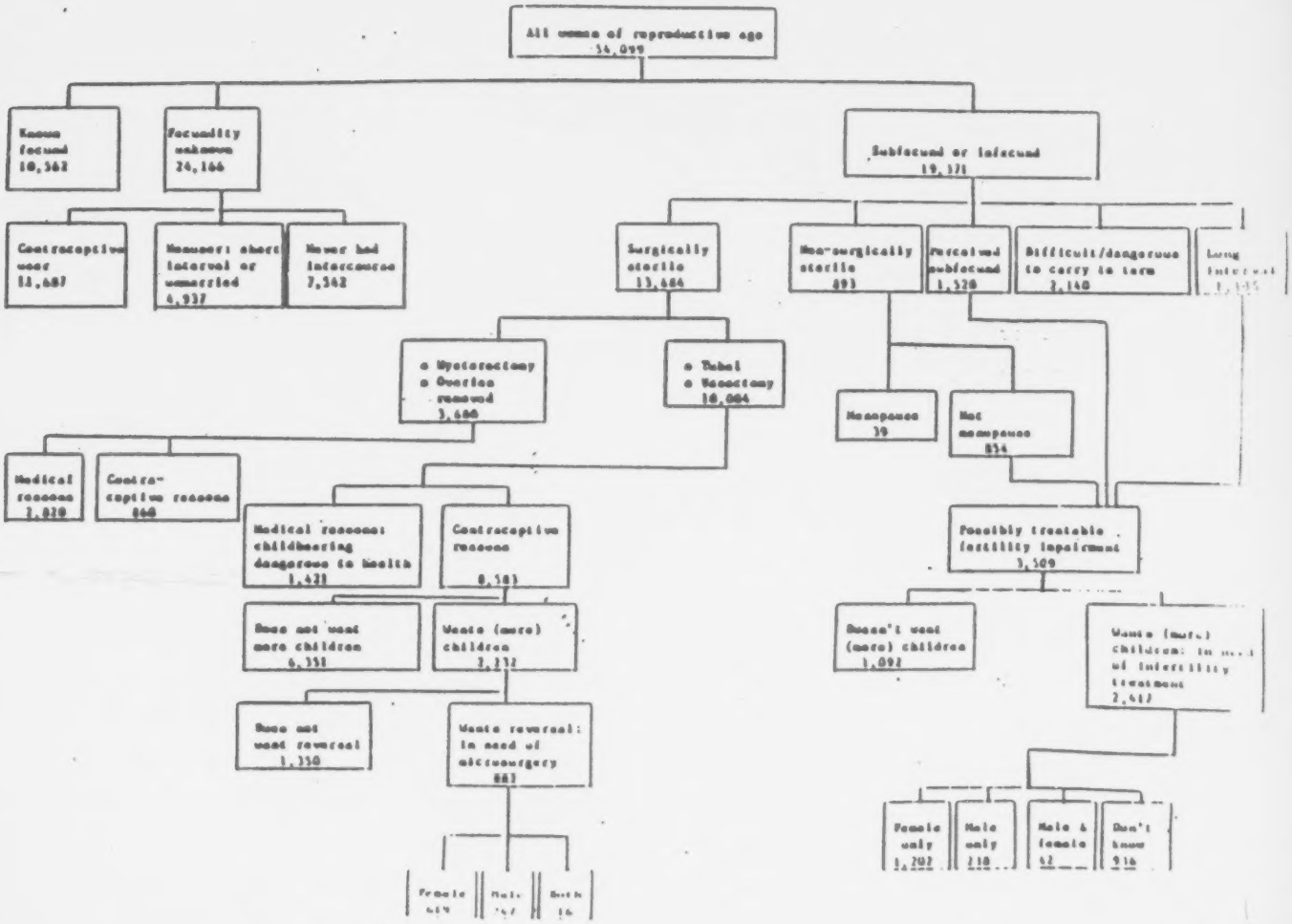
EXHIBIT 1-3

CLASSIFICATION OF ALL WOMEN AGED 15-44 BY FECUNDITY STATUS AND NEED FOR INFERTILITY SERVICES

(Thousands)



Source: Reproduced from The Alan Guttmacher Institute (see ref. 21).

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In theory it should be possible to construct prevalence estimates from incidence estimates. To get the number of infertile persons, one should be able to start with an estimate of the number of newly infertile persons in, say, year 1, and subtract all those couples who fall out of this pool either because they have a child, or divorce, or are sterilized, etc. To this pool we would add the net number of newly infertile people in each subsequent year. After a period of time this pool would reach a point of equilibrium where the number of people entering the pool would equal the number leaving (or where the pool grows at a uniform rate with the population).

Unfortunately, reconciling the various estimates available to provide a clear picture of both the prevalence and incidence of infertility and of the actual and potential demand for treatment services has not yet been possible. Nevertheless, the figures reported in this section are generally within the same order of magnitude and represent the state of our current knowledge of the magnitude of the problem.

What are Infertility Services?

For purposes of this report, infertility services include any services offered by trained medical personnel for the purposes of assisting in conception. Commonly, infertility services include both diagnostic services to determine the cause or source of infertility, and treatment services to correct or bypass the difficulty.

- Diagnosis commonly begins with a full physical and patient history. Common diagnostic tools include hormonal tests; semen analysis; cervical mucus tests; investigation of infections; sonography; and endometrial biopsies. Certain diagnostic tools are increasingly finding uses as treatment methods as well. A notable example is the laparoscopy which provides diagnostic capability as well as an opportunity to simultaneously treat certain conditions (laser laparoscopy).

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- Treatments can be classified as: (a) medical treatment, with fertility drugs, antibiotics, and other medications; (b) surgery, to repair damaged tubes, reverse sterility, or treat endometriosis; (c) in vitro fertilization; and (d) artificial insemination, using either husband or donor sperm.

Combinations and refinements of these treatments are also being offered. A brief round-up of the current level of activity and recent medical advances is provided below.

- Since in vitro fertilization (IVF) began with the birth of Louise Brown in Cambridge, England, in 1978, about 1,000 IVF clinics have opened world-wide. Some 3,000 test-tube babies have been born (3).

- In the United States, 144 IVF clinics have assisted in the birth of about 700 test-tube babies between 1981 and 1985. The number of IVF babies has been increasing annually, however, and is likely to continue to rise. Clinics reporting results for this study claimed over 700 pregnancies in 1986. With a likely miscarriage rate of one-quarter to one-third, these clinics would still be associated with close to 500 IVF babies.

- New methods have been developed, both in mechanical devices and surgical and non-surgical techniques. For example, eggs now are sometimes spotted using a combination of ultrasound and laparoscopy; the transvaginal ultrasound-guided system developed by French researchers in 1984 allows eggs to be retrieved without surgery, in an outpatient setting (32).

- Increased sophistication in a variety of skills and techniques have permitted other advances. Microsurgery is able to perform operations that would have been impossible 10 years

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ago. Some researchers are using microsurgery now to help "sluggish" sperm penetrate eggs (24). The GIFT technique, or Gamete IntraFallopian Transfer, allows an ovum to be physically transferred across a blocked portion of a fallopian tube. In the area of artificial insemination, new techniques allow intrauterine injection of washed, capacitated sperm. Embryo transfer is one of the latest in a series of remarkable developments, allowing a woman who cannot produce healthy eggs to be implanted with an embryo conceived with her husband's sperm and another woman's egg, and to carry the baby to term. (7)

- Cryopreservation, the freezing and subsequent thawing, of embryos, was pioneered in Australia as a way of enhancing flexibility and reducing the need for surgery. At least 30 healthy babies have already been produced from frozen embryos in the last year (15). Frozen eggs have also been responsible for the birth of two babies in Australia in 1986. About three quarters of frozen eggs survive the freezing and thawing process, unlike embryos, where only 25 to 50 percent survive cryopreservation. Freezing of eggs is still in the developmental stage and presents additional technical difficulties, although the practice may ultimately present fewer ethical dilemmas than frozen embryos.

- Home ovulation testing kits using monoclonal antibodies are now able to pinpoint ovulation with greater accuracy than ever before. A recent invention is the ovulation induction (GnRH) pump that injects pulses of gonadotropin-releasing hormone on an ongoing basis in order to stimulate ovulation; the pump can be used to provide the hypothalamic hormone in men as well (32).

- New parental situations have been created by advances in reproductive technology, in which up to five people can

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participate in the conception, carrying, and rearing of a child in the capacity normally reserved for parents. Exhibit 1-4 shows how the various problems and solutions result in different groups of parental functions.

1.3 ORGANIZATION OF THE REPORT

Chapter 2 of this report estimates total U.S. expenditures in 1986 on both infertility treatment services in general and in vitro fertilization (IVF) services in particular. Chapter 3 examines the infertility "industry," including private physicians, specialized IVF/infertility clinics, and public and private third party reimbursers. Results of the survey of IVF clinics undertaken specifically for this study are reported. Chapter 4 examines infertility treatment from the point of view of infertile couples, looking at the typical costs incurred for different types of diagnoses and treatments, as well as the effectiveness of different options. Treatment protocols are then combined into typical scenarios (applicable to female infertility patients), for which associated costs and affordability are discussed.

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EXHIBIT 1-4

NEW PARENTAL SITUATIONS

1. Medical/Surgical Fixes

Typical Problems:	Anovulation, hormonal problems Low sperm count Blocked tubes, endometriosis
Typical Solutions:	Fertility drugs Artificial insemination by husband Microsurgery, IVF, GIFT
Genetic Parents:	"Husband and Wife"
Gestational Mother:	Wife
Rearing Parents:	Husband and Wife

2. Artificial Insemination by Donor

Typical Problems:	Male infertility, unsolved or unexplained Male genetic disease
Genetic Parents:	Male Donor and Wife
Gestational Mother:	Wife
Rearing Parents:	Husband and Wife

3. Donor Oocyte or Embryo Transfer

Typical Problem:	Wife cannot contribute healthy egg
Solution:	Female donor contributes egg, fertilized in vitro with husband's sperm; embryo implanted in wife's uterus. OR Female donor is artificially inseminated, embryo is flushed, implanted in wife.
Genetic Parents:	Female Donor and Husband
Gestational Mother:	Wife
Rearing Parents:	Husband and Wife

4. Surrogate Mother

Typical Problems:	Wife cannot contribute healthy egg, cannot conceive or implant or carry
Solution:	Following artificial insemination with husband's sperm, surrogate conceives and carries baby to term.
Genetic Parents:	Husband and Female Surrogate
Gestational Mother:	Female Surrogate
Rearing Parents:	Husband and Wife

5. IVF/Surrogacy "Host Uterus"

Typical Problem:	Wife has healthy eggs, but cannot carry baby
Solution:	Wife contributes egg, fertilized in vitro. Embryo implanted in surrogate who carries it to term.
Genetic Parents:	Husband and Wife
Gestational Mother:	Female Surrogate
Rearing Parents:	Husband and Wife

2. AGGREGATE U.S. EXPENDITURES ON INFERTILITY

2.1 NON-IVF INFERTILITY EXPENDITURES

Estimates of the total cost of treating infertility in the U.S. allow us to measure the amount of resources our society is currently devoting to the problem of infertility. A recent report by Fuchs and Perreault (13) concluded that "most couples spend little or nothing for infertility problems; a few spend an extraordinary amount. As a rough estimate we assume an average expenditure of $200 per couple who seek help, yielding a total of $200 million for 1982." The authors go on to say that "even if the correct figure is twice as high, the overall estimate for reproduction-related health expenditures would increase by only 1%."

Cooper (10) estimated aggregate infertility expenditures to be between $340-$460 million in 1984. Her estimate was based on a survey of service prices and a construction of the cost of a typical set of infertility treatment procedures. The cost of each scenario was then multiplied by an estimate of the number of people who used the service, which was derived from several sources.

In this section we take a different approach. Our estimates are derived from a population-based survey, the National Medical Care Utilization and Expenditure Survey (NMCUES). In 1980, the NMCUES surveyed a nationally representative sample of 17,000 persons in 6500 households regarding their health care expenditures during the year. Each household was asked to keep a diary of each contact with a medical care provider throughout the year. For each such contact the respondent reported the type of provider, the reason for the contact, the amount charged by the provider, and the amounts paid by each third party. In addition, a host of demographic data was also collected for each person sampled.

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If persons receiving infertility treatment could be identified in the NMCUES then we would in effect have a sample of the complete expenditures and utilization of a representative national sample of infertile couples, something that so far has been unavailable. We have attempted such an analysis using a version of NMCUES made available by the National Institute on Aging and software developed by the authors at ICF Incorporated and modified specifically for this project, with the aid of staff from the National Center for Health Statistics (27, 29).

A strong advantage of this approach is that it does not rely only on reported treatments for infertility, strictly defined. Expenditures on diagnosing and treating diseases that result in or that are strongly associated with infertility can also be included. Another strength of this approach is that it permits estimates of the source of payments (i.e., private insurance, household out-of-pocket payments, government expenditures), and expenditures by type of service (e.g., hospitals, physicians, etc.).

Finally, this approach provides estimates that can be set in the context of expenditures on other diseases, and on health care in general. For example, Exhibit 2-1 contains an estimate of aggregate national personal health care expenditures derived from NMCUES. It shows total personal medical care expenditures in 1980 to be $149.9 billion, of which household out-of-pocket expenditures amounted to $42.9 billion.*

Because respondents reported expenditures by condition, we are able to construct a tableau such as Exhibit 2-1 for any disease condition or

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*Anderson and Thorne (2) compared estimates from the NMCUES to those of HCFA's National Health Accounts (NHA) and found there to be a discrepancy in the neighborhood of 10-20%. Consequently, one may wish to raise these estimates by 20 percent in order to make them agree with the NHA, although there is no overwhelming reason to assume that the NHA estimates are more accurate than those of NMCUES.

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EXHIBIT 2-1

AGGREGATE NATIONAL PERSONAL HEALTH CARE EXPENDITURES

PERSONAL HEALTH CARE EXPENDITURES 1980
POPULATION: TOTAL NMCUES POPULATION

MEDICAL CONDITION: ALL CONDITIONS

TYPE OF PAYMENT
(MILLIONS)

TYPE OF SERVICE	TOTAL NUMBER	TOTAL CHARGE	HOUSE HOLD	PRIVATE INS	PREPAID	PHILANT	MEDI-CARE	MEDI-CAID	OTH PUB ASST.	VETERANS	DEFENSE MIL	DEFENSE CHAMPUS	WORK COMP	OTH PUB FED	EXPEND S+L
HOSPITAL	61.7	82057.8	9822.4	30799.0	2740.6	2963.7	18960.3	9948.6	647.7	1381.6	1777.4	497.2	740.7	1357.3	828.4
ER	121.8	4641.0	1077.3	1749.4	171.4	209.2	329.1	730.5	38.7	15.1	106.7	33.5	126.1	16.7	70.1
OUTPAT	279.4	6287.4	1181.4	1684.1	509.9	308.7	827.4	673.4	63.3	165.8	471.3	48.6	51.7	190.0	120.8
INPAT	700.4	71129.4	7563.6	27365.5	2059.3	2449.9	17803.8	8548.7	545.7	1200.7	1199.4	415.2	560.9	1150.6	637.5
DOCTOR	647.1	33466.3	11792.9	11105.6	1004.4	1299.2	4731.0	2477.9	148.9	70.4	59.9	153.1	292.8	101.3	288.1
0-100	36.3	15091.8	7519.7	3308.8	473.1	563.4	1312.1	1421.6	94.1	40.0	46.3	46.3	137.9	24.6	148.5
101-300	17.0	6268.7	1855.0	2447.6	193.1	295.8	883.5	413.1	15.7	14.0	3.6	26.6	85.3	13.1	53.7
301+	294.4	12105.8	2418.1	5349.1	338.2	439.9	2535.4	643.1	39.0	16.3	10.0	80.2	70.6	63.6	86.0
DENTAL	173.8	16770.5	11013.0	3491.3	607.1	730.7	28.7	669.2	30.0	78.2	63.9	6.0	12.0	33.4	84.8
OTH PROF	685.5	4297.0	2287.5	984.0	75.7	117.5	301.6	307.1	14.1	0.1	2.9	3.3	56.4	7.3	145.8
DRUG	59.0	7783.8	5034.3	1188.6	185.7	211.8	89.7	789.6	38.7	84.3	85.7	15.5	10.7	37.5	39.4
GLASSES	107.0	2986.6	2402.5	193.2	26.6	97.5	93.0	128.7	3.6	4.0	7.2	0.5	1.7	0.9	28.7
OTH HLTH		2636.4	637.1	388.1	193.5	176.5	334.0	318.1	30.1	54.2	55.6	43.0	26.8	46.1	338.5
TOTALS:		149998.2	42989.6	48149.6	4833.6	5596.7	24538.3	14639.2	913.0	1672.8	2052.6	718.7	1141.3	1583.8	1753.8

NOTE: ESTIMATES FROM NMCUES EXCLUDE HEALTH CARE EXPENDITURES BY THE INSTITUTIONAL AND NON-CIVILIAN POPULATIONS AND ALL EXPENDITURES FOR NON-PRESCRIPTION DRUGS.

combination of diseases. To construct one for infertility-related expenditures, we undertook the following procedure. As a first attempt we estimated the expenditures for the following infertility related diseases:

1. Venereal Disease
2. Malignant Neoplasms of Genitourinary Organs
3. Diseases of the Urinary System
4. Diseases of Male Genital Organs
5. Diseases of Female Genital Organs

Clearly not all such diseases are related to infertility. We therefore asked an infertility specialist (12) to specify further those diseases in the International Classification of Diseases (22) related to infertility. The resulting list of 100 ICD-9 codes is contained in Appendix A.

Although the conditions in Appendix A are related to infertility, expenditures on many of these conditions would not likely be considered infertility-related. For example, expenditures to treat a life-threatening cancer would not be considered infertility-related, even though infertility may be associated with the cancer. In order to estimate the percentage of expenditures on each disease that can be considered infertility-related, we consulted several additional infertility specialists (5, 17).

The specialists provided estimates of the percentage of treatments where concern for infertility was a primary factor in determining treatment, or where it was extremely likely to quite likely that a patient with the disease would be treated for infertility. (See Appendix A for an example of one specialist's percentages.) We applied these percentages to NMCUES data on expenditures for each disease. This approach gave us three estimates of U.S. expenditures: low: $345.1 million, moderate: $479.6 million, and high: $676.4 million. This range of values is within the range of estimates developed by Cooper and by Fuchs and Perreault.

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For this analysis, we will use the intermediate estimate of $479.6 million. Exhibit 2-2 reports this sum by type of medical service and source of payment. Exhibits 2-3 shows in percentage terms how these expenditures were distributed by type of service and source of payment. Hospital expenditures, for example, amounted to $296.8 million, representing 62.5 percent of total infertility expenditures. The other major category of services was expenditures on doctors, accounting for $150.6 million in 1980, or 31.4 percent of total infertility expenditures. Close to half that amount ($70.5 million) was spent on doctors' charges of over $300 per visit.

Exhibit 2-3 also shows how a couple's dollar spent on infertility was divided among services. For every household dollar on infertility in 1980, more than half (55.1 percent), went for physician services. Over a third (35.7 percent) went to hospitals (mostly for inpatient services), and less than 10 percent was spent on drugs.

The picture for expenditures by private insurance companies is complementary to that for households. Private insurance spent 68.8 percent of their budget on hospital care and 25.8 percent on physician care. Two-thirds of their expenditures on physician services were for services whose charge exceeded $300.

The category of "other" expenditures includes the amounts paid for infertility services by various government programs, philanthropy, and company clinics. Whereas these sources of payment play a considerable role in national expenditures, their role in infertility is limited to less than 10 percent of expenditures with nearly three-quarters of that amount spent on services provided in hospital outpatient facilities. As is generally known, and as is borne out by our survey of IVF clinics and a survey of private physicians conducted by the Alan Guttmacher Institute (21), the primary sources of funds in infertility treatment are patient fees and private insurance. (The proportion of expenditures covered by insurance is discussed more fully in section 3.3 below.)

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EXHIBIT 2-2

1980 INFERTILITY EXPENDITURES DERIVED FROM NMCUES

POPULATION: PERSONS AGED 15 TO 44

PAYMENTS BY SOURCE
(IN MILLIONS)

TYPE OF SERVICE	NUMBER OF SERVICES	TOTAL CHARGES	HOUSE-HOLDS	PRIVATE INSURANCE	ALL OTHER SOURCES
HOSPITAL		$296.8	$ 36.7	$232.7	$27.4
Emerg. Rm	0.1	1.6	0.6	1.0	0.0
Outpatient	0.5	65.0	5.4	39.9	27.4
Inpatient	0.8	230.3	30.7	191.9	0.0
PHYSICIAN	1.8	150.6	56.7	87.2	6.6
$0-100	1.5	43.0	27.3	12.4	3.3
$101-300	0.2	37.1	20.1	16.7	0.3
$301+	0.1	70.5	9.3	58.2	3.0
OTHER PROF	0.1	2.6	0.3	1.2	1.1
DRUGS	1.1	25.5	8.8	15.6	1.1
OTHER HEALTH	0.2	4.0	0.4	1.5	2.1
TOTAL:		$479.6	$103.0	$338.3	$38.3

Note: Estimates from NMCUES exclude health care expenditures by the institutional and non-civilian populations and all expenditures for non-prescription drugs.

Source: Developed by Thorne, E. and Langner, G. from National Medical Care Utilization and Expenditure Survey (NMCUES) data.

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EXHIBIT 2-3

PERCENTAGE DISTRIBUTION OF INFERTILITY EXPENDITURES BY TYPE OF SERVICE NMCUES, 1980

POPULATION: PERSONS AGED 15 TO 44

PAYMENTS BY SOURCE
(PERCENTAGES)

TYPE OF SERVICE	TOTAL CHARGES	HOUSE-HOLDS	PRIVATE INSURANCE	ALL OTHER SOURCES
HOSPITAL	62.5%	35.7%	68.8%	71.5%
PHYSICIAN	31.4	55.1	25.8	17.2
OTHER PROF	0.5	0.3	0.4	2.9
DRUG	5.3	8.5	4.6	2.9
OTHER HEALTH	0.8	0.4	0.4	5.5
TOTAL:	100.0%	100.0%	100.0%	100.0%

Note: Estimates from NMCUES exclude health care expenditures by the institutional and non-civilian populations and all expenditures for non-prescription drugs.

Source: Developed by Thorne, E. and Langner, G. from National Medical Care Utilization and Expenditure Survey (NMCUES) data.

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2.2 AGGREGATE EXPENDITURES ON IVF

This section provides an estimate of expenditures on IVF in the 144 IVF centers in the U.S. These estimates are based primarily on the survey of IVF centers undertaken for this study.

Of the 38 centers that responded to our questionnaire, 23 centers reported on the volume and cost of their IVF procedures. These 23 centers reported undertaking 3,823 completed IVF procedures at an average cost of $4,125. These services represented revenue amounting to about $15,750,000. The average number of annual treatment cycles provided by these clinics was 166 per clinic. This estimate is based upon a sample that included 3 large clinics that averaged 675 treatment cycles per year. The remaining 21 clinics averaged 90 treatment cycles per year.

If the centers that did not respond to our survey received revenues similar to those that did, then total expenditures on IVF would amount to nearly $110,000,000. However, if we assume that the remaining 121 clinics experienced an average of 90 treatment cycles per year then total revenues for all 144 clinics would amount to $60,750,000. For the present analysis we will assume that 1986 expenditures on IVF lay in the middle of these estimates at $85,000,000.

2.3 TOTAL 1986 INFERTILITY EXPENDITURES

We estimate total 1986 expenditures as the sum of non-IVF and IVF expenditures. To estimate non-IVF expenditures in 1986, we augment the estimate of 1980 non-IVF expenditures (developed in section 2.1) by 10 percent each year to reflect changes in the cost of medical care and in the incidence of infertility diagnosis and treatment. This raises the 1980 estimate of $480

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million to about $850 million in 1986. Together with IVF expenditures of $85 million, total infertility expenditures are estimated at $935 million in 1986.

Non-IVF Infertility Expenditures	$850 million
IVF Expenditures	85 million
Total 1986 Infertility Expenditures	$935 million

This approach assumes that the treatment of infertility has not changed "structurally" (e.g., in the relative expenditures on hospital services vs. doctors) in the intervening years. It also assumes that IVF does not replace previous treatments, but represents a new, supplemental cost.

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3. PROFILE OF THE INFERTILITY INDUSTRY

This chapter provides a profile of the infertility industry, in three parts. Section 3.1 presents background data on the different types of infertility service providers. Section 3.2 provides more detailed information on the structure and operation of the IVF infertility clinics. Section 3.3 discusses third party reimbursement of infertility treatment.

The major data sources for this chapter are a 1983 national survey of private physicians and infertility centers conducted by The Alan Guttmacher Institute (AGI) (21, 30), the National Survey of Family Growth (19, 31), an analysis of the National Ambulatory Medical Care Survey (NAMCS) data base (10), and a survey of IVF infertility clinics conducted for this report.

3.1 PROVIDERS OF INFERTILITY TREATMENT SERVICES

Providers of medical infertility treatment services typically fall into three categories:

(1) Primary care physicians.

(2) Specialized infertility centers that offer in vitro fertilization (called "IVF centers" in this report). These are discussed in detail in section 2.2 below.

(3) Other centers offering infertility treatment.

In the last category are a variety of infertility service providers, including family planning agencies in hospitals, health departments, and Planned Parenthood facilities. Under the guidelines to Title X of the Public Health Service Act, family planning service grantees must make basic infertility services available to clients upon request. A survey conducted by the Alan Guttmacher Institute estimates that 70 percent of family planning agencies, or 1,712 agencies nationwide, provide at least some basic infertility services

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(such as physical exams, counseling, infection investigation, and basal body temperature instruction) (21). However, at least half the family planning agencies responding to this question said that they see fewer than 10 infertility patients per year; lack of demand, lack of appropriately trained staff and lab facilities, and the high costs of infertility services are among the reasons that this type of agency accounts for a minimal amount of infertility services.

The category of "other" infertility service providers also includes, however, an unknown (although probably small) number of centers that specialize in infertility services but that do not, for one reason or another, provide IVF services.

Primary Care Physicians

Infertility patients who seek services from primary care physicians are served primarily (66 percent) by obstetrician/gynecologists, followed by urologists (22 percent). However, infertility care is also provided by other physicians. AGI (21) surveyed a sample of the 100,000 private physicians in four specialties, and estimated that some 45 percent of them (or 45,600 physicians) provide infertility care. These 45,600 physicians include 17,500 general/family practitioners; 1,400 surgeons; 20,600 ob/gyns, and 6,100 urologists. The large percentage of general and family practitioners (GP/FPs) among the group of physicians providing infertility care is explained by the large number of GP/FPs in practice (about twice as many as ob-gyns), as well as by their widespread geographical distribution (30).

Most (96 percent) obstetrician/gynecologists and urologists (92 percent) provide at least some infertility services as part of their private office practice. Physicians practising in the North central and Western regions of the country, as well as younger physicians are slightly more likely to treat infertility than other physicians (30).

Estimates of the number of patients treated by private physicians for infertility vary widely across sources. Data from the 1980-81 National

Ambulatory Medical Care Survey show that the number of office visits to physicians practicing obstetrics and gynecology by the principal diagnosis of infertility, averaged 556,000 annually (10). In analyzing this data, Cooper (10) estimates that between 111,200 and 161,240 new infertility cases are diagnosed each year and that between 200,000 and 300,000 patients are treated for infertility each year.

The AGI study (21) estimates that private physicians in the U.S. see 1.55 million patients annually for infertility; this may include patients who see more than one physician, as well as both partners in a couple. The National Survey of Family Growth estimated that 1 million to 1.2 million couples consulted a physician about infertility problems in 1981; about 80 percent of the consults (i.e., 800,000 to 950,000) were sought from private physicians (21).

Types of Infertility Services Offered. The National Survey of Family Growth provides data on the most frequent infertility services received by the population. Overall, the 1982 survey reports the following services as most popular among female respondents: advice on the timing of intercourse (19 percent); general health advice (18 percent); drugs to induce ovulation (17 percent); other advice (15 percent); and tests (12 percent). The most frequent reported infertility service for husbands was a sperm count (19).

Although virtually no private physicians provide all infertility treatment services, the vast majority of ob/gyns provide basic diagnostic services, as well as a substantial number of diagnostic/treatment services, including clomiphene (91 percent), hysterosalpingograms (89 percent), and laparoscopies (85 percent). Similarly, 83 percent of urologists provide basic physical exams and counseling, as well as semen analyses (21). Artificial insemination is also frequently arranged with private physicians (34).

Access to Services. In general, a higher proportion of white women (15 percent) report using infertility services compared to black women (10 percent), particularly for women over age 24. Women who had ever been

married, who had higher incomes, and with higher educations reported higher use of infertility services than women never married, or with low incomes or low education. (19) Women with primary infertility tend to seek services more than women with secondary infertility (18).

There is considerable evidence that, at least in the 1976-82 period, infertility services were not reaching a considerable number of infertile couples. For example, as of 1982, about 200,000 married women with primary infertility had never sought infertility services although they wanted a baby (18). Another 550,000 married women with secondary infertility had never sought services despite the fact that they wanted a baby. This latter group of women tends to be of lower socioeconomic status, to have less education, and to never have worked than women with secondary infertility who have sought services.

With regard to financial barriers to treatment, among the private physicians surveyed by AGI, 21 percent reported that they accept Medicaid patients; only 6 percent were willing to vary their fees for low-income patients. (Among 19 specialized infertility centers, AGI found a somewhat better record: about half accept Medicaid reimbursement and 16 percent reduce their fees for low-income patients.) The AGI study concluded that infertility services are less available to low-income couples, and that low-income women face serious financial obstacles to obtaining specialized or complex infertility services.

Referral Routes. In general, primary care physicians appear to be the front-line providers of infertility treatment services. Most patients seeking assistance with conception first discuss their concerns with either an obstetrician/ gynecologist (for a female) or a urologist (for a male) or both. AGI reports that most physicians who provide infertility services will refer patients elsewhere when necessary, usually to another physician. However, for female patients, ob/gyns are more likely than GPs to make referrals to infertility centers or clinics rather than to other physicians. (This may be due to the relatively complex services that such ob/gyns already provide for females, and the need for specialty referrals).

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Viewed from the other side, our survey of IVF clinics shows that they receive a small amount of referrals from hospitals (no more than 20 percent for any of the clinics responding to our survey). A major source of patients for most IVF clinics is referrals from physicians (a simple average of 44 percent for responding clinics). But referrals from other patients, or "self-referrals" on the part of the patients appear to be equally, if not more, important for IVF clinics responding to our survey.

3.2 IVF CLINICS

This section provides a more detailed profile of IVF infertility clinics, focusing on their operations and characteristics of the market in which they operate. Profile characteristics discussed below include the organizational status of the clinics (non-profit or for-profit), their size and age, funding sources, types of services offered, demand for services, barriers to entry, and future trends.

Data for this section come from a survey conducted specifically for this study. A questionnaire was mailed to the 144 IVF clinics listed by the American Fertility Society as providing IVF services in 1986. Responses were received from 38 IVF centers. Although the respondents are geographically well distributed (see below) and include a range of sizes and types of centers, it is likely that they represent a more successful sample of clinics with respect to their IVF experience than the majority of IVF centers. Note that although 38 clinics returned the questionnaire, not all respondents anwered every question asked. Consequently, for some questions, smaller respondent sample sizes are reported.

General Operating Characteristics

Currently, there are 144 infertility clinics in the U.S. known to be offering IVF (1). About 80 percent or 115 of the IVF programs are associated

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with universities and/or hospitals. Another 18 programs are other types of private organizations; the status of the remaining 11 could not be determined. IVF centers are located in 38 states; only three states have more than 10 clinics, as of September 1986 (California with 16, New York with 13, and Texas with 13). The regional breakdown of the centers is as follows:

Northeast	29	(20%)
Northcentral	31	(22%)
South	54	(37%)
West	30	(21%)

Although the centers are fairly well distributed around the country, it should be noted that even on a state-by-state basis, infertile couples seeking services in 12 states must travel to another state in order to get treatment.

By way of comparison with the full set of 144 IVF centers in the country, the 38 IVF centers responding to the survey for this study are located in 24 states. Their regional breakout is as follows:

Northeast	9	(24%)
Northcentral	5	(13%)
South	17	(45%)
West	7	(18%)

Twenty (55 percent) of the responding IVF clinics are located in urban centers of more than 1 million; 15 (42 percent) are located in metropolitan areas of between 100,000 and 1 million people; only one responding center is located in an area with fewer than 100,000 people.

Organizational Status. The IVF centers that responded to our survey are evenly split between non-profit and for-profit status. The predominant organizational arrangement, for over half the respondents, is a non-profit infertility center that is part of non-profit university or hospital. The remaining centers include:

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(1) Independent, for-profit outfits (22 percent); and

(2) For-profit centers affiliated with a non-profit institution (such as hospitals or universities) (16 percent).

Thus, similar to the universe of IVF clinics, close to 80 percent of the respondents in our survey are associated with a hospital or university medical school, whether as a non-profit department or as a for-profit subsidiary.

Size of Operations Most of the IVF centers are relatively small in staff size, rarely exceeding 20 staff in the largest of those responding to our survey. Typically, the staff includes:

- 2 to 8 physician/surgeons;
- 1 to 2 reproductive biologists;
- 2 to 4 registered nurses;
- 2 to 8 technicians; and
- 1 psychologist.

Thirty-six responding clinics reported seeing a total of 14,760 patients in 1985, or about 410 patients per clinic. If that ratio holds for the larger universe of IVF infertility centers, then the 144 IVF clinics saw approximately 60,000 patients in 1985 (with 14,000 patients actually undergoing IVF treatment). On average, responding clinics reported that their patients stayed with them for approximately 1 year.

Type of Services Offered. The responding IVF centers generally offered a variety of services beyond IVF and have been in operation for a number of years. Only 6 of the 38 centers responding offered only IVF services. The others generally offered microsurgery as well as other infertility treatment services. As would be expected, most of the IVF services were established in 1983-84; over two thirds of respondents indicated that they began offering microsurgery between 1975 and 1980; other infertility services, for at least one-third of the centers, were first offered before 1975.

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Certain clinics have restrictive policies in effect as to the types of patients they will serve. Among IVF clinics surveyed for this report, 15 of 38 respondents (39 percent) did not specify any restrictions in the types of patients they serve. Among the remaining clinics that do have restrictive policies, 14 (38 percent) will not serve individuals without partners and 10 (28 percent) have age restrictions (under ages 17-20 or over ages 39-50). Seven facilities in the survey (19 percent) report that they do not treat men or provide only limited testing for males. A few clinics noted that they do not serve unmarried women or unmarried couples, particularly for IVF and artificial insemination. No pattern of restrictions related to the organizational status of the clinics could be discerned.

The centers responding to our survey reported offering most of the well-established infertility diagnostic and treatment services. (See Exhibit 4-3 in Chapter 4 for a list of procedures on which costs were reported.) The only major exception is in the area of male microsurgery and artificial insemination; the relatively little male infertility treatment offered by these clinics is partly accounted for by the explicit policies at some of these centers to exclude men. In general, the IVF clinics appear to be much more oriented towards female microsurgery and female treatment.

A second item of interest is that many of the IVF clinics do not yet offer the "latest" techniques and advances in infertility treatment (such as embryo freezing, laser laparoscopy, or even frozen donor sperm for artificial insemination). The lag time for diffusion of new technology appears to be on the order of at least two years.

Funding Sources. Patient fees account for the largest source of funds for IVF clinics, in general making up 80 to 100 percent of revenues for all but 2 of the 35 respondents to this question in our survey. Aside from one IVF clinic which receives 70 percent Medicaid patients, only 5 other IVF centers reported receiving any Medicaid funds, and in no case did Medicaid funds exceed 10 percent of total funding. Twelve clinics reported receiving university subsidies, other research grants, and/or other funds.

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Market Characteristics

Demand for Services. Of the IVF centers responding to our survey, 44 percent reported a waiting list of patients of over one month. Unlike the well-known Jones clinic in Norfolk, Va., however, where the waiting list is approximately 16 years long (14), the longest waiting list in the sample of respondents to our survey was six months.

IVF clinics were asked what impediments existed to further expansion of their operations. For the 77 percent who indicated that impediments did exist, five chief reasons were cited that prevent them from providing specific services or from expanding further:

- Research funding needed for further growth;
- Too costly or inconvenient to provide services;
- Too little demand for the services;
- Inadequate lab facilities available; and
- Competition from other medical providers in the area.

When asked specifically about competition, two-thirds of the IVF clinics responding noted that they were competing with infertility centers or specialists in the same city. About one-third of the clinics noted that their major competitors were located in the same state; one-third also indicated that they compete with IVF centers across the country.

Barriers to Entry for New Clinics. To what extent is it difficult for infertility clinics to expand into the market for IVF services? Most IVF clinics begin as adjuncts to ob/gyn departments that have been involved in infertility services for numerous years and that want to expand slowly into the new technology. Although IVF requires a good deal of specialty equipment and labor, much of this equipment and labor is generally available in most hospitals. As a result, IVF clinics can often begin operation without equipment and labor specifically dedicated to IVF. This is observed in the very wide range in the number of IVF cycles conducted around the country. While the large, well-known clinics operate at the level of 800 to 1000

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treatment cycles per year, one third of the clinics responding to our survey performed fewer than 50 IVF cycles per year. Some are even operating at a rate of less than 15 per year. Furthermore, the small clinics report pregnancy rates nearly comparable to those of the large clinics.

That clinics operating at 15 cycles per year can coexist with clinics operating at 800 cycles per year is an indicator of the ease with which a viable clinic can be organized and run from an existing medical facility. In personal interviews, two small clinics described the equipment they were using, the cost of this equipment, and the special technicians required for IVF. The major items of equipment required for ovum preparation and embryo transfer included an incubator, super clean water system, autoclave, and low temperature freezer to freeze embryos. The cost of purchasing this equipment was estimated to be in the neighborhood of $40,000-$60,000.

The remainder of equipment needed, such as microscopes, video camera and monitor for the laparoscope, and all the hospital and surgical equipment, are generally priced internally at the margin so that very little of this cost is passed on to the IVF facility. In addition, the services of technicians and an embryologist can generally be found in the hospital so that these specialty labor costs can also be priced at the margin. Finally, an expanding ob/gyn facility will not have to incur the expense of waiting and examining rooms.

The conventional wisdom is that to be effective at providing new medical services one must have dedicated plant, equipment, and staff, and that in order to efficiently use dedicated resources one must take advantage of economies of scale and operate a large facility. That so many "mom and pop" type IVF facilities can survive, and even prosper financially, while performing fewer than 50 cycles per year, suggests that the conventional wisdom may not apply in the case of IVF. Thus, in the future, should demand increase radically due to wider insurance coverage of IVF, or due to enhanced effectiveness of IVF, or due to a change in the public's perception of the cost and effectiveness of IVF, we can expect supply to increase to meet demand without necessarily encountering bottlenecks.

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Future Trends

New developments in infertility diagnosis and treatment have the potential to revolutionize the way services are demanded and offered. A number of trends in particular could significantly affect the estimates developed in this report:

- Charges. About a third of IVF clinics responding to our survey indicate that they expect to increase their charges next year (1987), by anywhere from 3 percent to 30 percent. (A little over half the responding clinics reported that they had increased their charges this year over last year; about half of these clinics reported changes under 10 percent, the other half had price increases of between 10 and 30 percent.)

- New Research and Technologies. IVF clinics surveyed for this report were asked whether they anticipate offering new or experimental procedures in the near future, and whether they anticipate changes in the effectiveness of particular types of treatments or diagnoses. A majority of respondents indicated their intentions to expand into the areas of embryo freezing and the cryopreservation of oocytes, and the use of donor oocytes and embryos in IVF for agonadal women.

  A number of clinics noted that they will begin offering some of the techniques that have been fairly well established at larger clinics but that have not yet been disseminated throughout the industry. Among the procedures mentioned are lasar laparoscopy, GIFT, intrauterine insemination, surrogate pregnancies, artificial insemination utilizing frozen donor semen, sex selection for AI, and ultrasound guided vaginal oocyte retrieval.

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Other areas in which clinics mentioned possible expansion of services include andrologic diagnosis and treatment, immunologic studies, embryo transfer, estrogen replacement therapy, gamete manipulation, hormone level/evaluation and treatment correlation, possible changes in the stimulation regime for IVF, GIFT in association with diagnostic laparoscopy, and further testing of pilot programs such as Super Ovulation Uterine Capacitation Enhancement (SOURCE).

Most of the responding IVF clinics look forward to continued progress in the success of IVF and GIFT procedures, although no dramatic changes are expected. Several clinics expect the improvement in IVF effectiveness to be around 10 to 30 percent.

- Effects of Insurance Policy. Virtually all IVF clinics are in agreement that changes in reimbursement policy would affect the number of patients seeking infertility services. Expanded insurance coverage of IVF and GIFT services could have a major effects on the demand for these services. Couples who cannot currently afford IVF or GIFT, or who cannot afford more than one cycle, would be able to undergo the procedures. This expanded group would include both couples who are now "doing nothing" in the absence of IVF as well as women who are currently undergoing tubal surgery in lieu of IVF or GIFT. Making IVF or GIFT insurance-reimbursable could in some instances replace low yield surgical procedures which currently are reimbursed.

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3.3 THIRD PARTY REIMBURSEMENT

Insurance Coverage of Infertility Services

By and large, most conventional infertility treatment services have traditionally been covered by insurance, as long as they can be associated with medical conditions requiring diagnosis and/or treatment. Of total U.S. infertility expenditures (estimated in Chapter 2 at $479.6 million in 1980), private insurance paid 70.5 percent of total charges, and households paid 20.5 percent out-of-pocket. These figures are shown in Exhibit 3-1.

Exhibit 3-1 further describes the relative contribution of sources of payment by specific types of services. For example, while households paid 12.4 percent of hospital costs related to infertility, they paid 37.6 percent of physician charges. As would be expected, households paid a larger share (63.5 percent) of physician charges under $101 than in cases where physician charges were over $300 (13.2 percent paid by households).

Insurance Coverage of IVF Services

With the advent of in vitro fertilization (and other reproductive technologies such as artificial insemination), the issue of insurance coverage has become more controversial and more influential in determining what types of treatment are sought and provided.

This section reviews the legislative and actuarial history of coverage of IVF procedures by third parties. We begin by discussing the particular characteristics of the risks associated with IVF that help explain the reluctance of insurers to include IVF amongst insurable health risks and how the resulting IVF insurance programs are structured.

A major concern of insurers is to protect themselves from insuring risks where the likelihood of the event occurring can be influenced by the insured party. This concern is generally referred to as moral hazard. Should

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EXHIBIT 3-1

PERCENTAGE DISTRIBUTION OF INFERTILITY EXPENDITURES BY SOURCE OF PAYMENT NMCUES, 1980

POPULATION: PERSONS AGED 15 TO 44

TYPE OF PAYMENT
(MILLIONS)

TYPE OF SERVICE	TOTAL CHARGES	HOUSE-HOLDS	PRIVATE INSURANCE	ALL OTHER SOURCES
HOSPITAL	100.0%	12.4%	78.4%	9.2%
Emergency Room	100.0	37.5	62.5	0.0
Outpatient	100.0	8.3	61.4	30.3
Inpatient	100.0	13.3	83.4	3.3
PHYSICIAN	100.0	37.6	58.0	4.4
$0-100	100.0	63.5	28.8	7.7
$101-300	100.0	54.5	45.4	0.1
$301+	100.0	13.2	82.5	4.3
OTHER PROF	100.0	11.5	46.2	42.3
DRUGS	100.0	34.5	61.2	4.3
OTHER HEALTH	100.0	10.0	37.5	52.5
TOTAL:	100.0%	21.5%	70.5%	8.0%

Note: Estimates from NMCUES exclude health care expenditures by the institutional and non-civilian populations and all expenditures for non-prescription drugs.

Source: Developed by Thorne, E. and Langner, G. from National Medical Care Utilization and Expenditure Survey (NMCUES) data.

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insurers underwrite such risks, they could be subject to adverse selection. In their quest for a "fair bet," insurers will often pass up an insurable risk when they think they cannot at reasonable cost protect themselves from adverse selection. Insurance markets can fail altogether if insurers think they are buying a risk but are in fact buying a certainty.

Even if they can arrange a fair risk, insurers do not want the amount at which they are at risk to be extremely large should they be unlucky. Furthermore, they prefer to insure events where the likelihood of the event occurring is known rather than uncertain. Finally, health insurers try to avoid covering procedures that have not met with general approval and which may be difficult to sell to policyholders. Examples are costly experimental procedures whose efficacy has not yet been proven and/or procedures for which a moral consensus has not yet been developed.

When insurers do undertake to insure events where adverse selection is likely, or where the possible losses are high or where the risks are not well known, or where it may be difficult to sell the need for the procedure to large employer/employee groups, they try to institute mechanisms to protect themselves. When insurers cannot reasonably protect themselves and where for reasons of social policy we would like to protect these individuals, then these risks are often borne by society as a whole through social insurance schemes. Medicare and Medicaid are prime examples.

Coverage of IVF procedures poses several of these problems for insurers. First, IVF is a member of a class of risks where the purchasers of insurance may have better information than the insurer at the time of purchase regarding the likelihood that they will need the procedure. For this reason insurers resisted coverage of pregnancy for a long time. They considered having a child to be a choice, not an unforseen event, and believed that couples wishing to have a child should, therefore, simply save for that event. Unless all insurers provided pregnancy benefits (or IVF benefits), an insurer might fear that persons knowing in advance that they wanted children or needed IVF would sign up for insurance.

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In addition, the potential large cost of IVF combined with a perception of low success makes it difficult to sell premium increases to policyholders. That IVF is perceived to be a procedure of highly uncertain benefit to the few at the expense of the many has served to further deter insurers from entering this market. Finally, the perception of a lack of societal consensus on the morality of the new reproductive technologies has again contributed to the insurance industry's reluctance to enter this market.

Current Level of Insurance For IVF

Until very recently almost all health insurance plans specifically excluded coverage for IVF. Typical is the language used by Aetna and Blue Cross/Blue Shield in their coverage of Federal employees under the Federal Employee Health Benefits Program (FEHBP). These programs state that they exclude from coverage artificial insemination by donor, in vitro fertilization, and reversals of sterilization (23).

Despite the almost universal exclusion of IVF from coverage by insurance, our survey of IVF clinics revealed that for the current patient population insurance coverage was widespread. It has been reported to us by some centers that when they submit insurance claims separately for each of the diagnostic and treatment components of IVF, the cost of the components are reimbursed. One major center found that laparoscopies performed as part of an IVF procedure were covered by insurance at a reimbursement level that averaged 70 percent.

Whatever the reason for the reimbursement by the insurance industry of procedures that they explicitly exclude, this information is not widespread and demand for IVF services has very likely been held back by the perception that IVF services are not covered.

Because of the reluctance of insurers to cover IVF procedures, several state legislatures have considered mandating IVF coverage by insurance

carriers in their state. The first state to actually do so was the State of Massachusetts which required insurers operating there to offer IVF coverage as a rider to their health insurance policies effective February 1, 1986. Policyholders were given the option of electing the IVF rider at rates approved by the state of $.75/person/month (35).

The second state to mandate IVF coverage was the State of Maryland. Effective July 1, 1985, every insurance carrier operating in Maryland was required to include IVF procedures in its normal schedule of covered benefits (35). Attempts by the insurance industry to limit coverage to five cycles were defeated and coverage exists in that state now for an unlimited number of IVF attempts. At the same time, some important restrictions on coverage were put in place:

(1) the person seeking IVF treatment must have been seeking such treatment for at least five years;

(2) the person seeking IVF treatment must have exhausted all non-IVF treatments, including tubal surgery; and

(3) artificial insemination by husband only is covered.

Although the State mandated coverage by all insurance carriers, not everyone in Maryland is in fact covered. Since the State has no jurisdiction over Federal or City employees, the mandate does not apply to them. Consequently, neither Federal employees working or residing in Maryland nor employees of the City of Baltimore are covered. Furthermore, the mandate does not apply to groups that are self-insured. Many, if not most, organizations with 500 or more employees have Administrative Services Only (ASO) contractual arrangements with an insurance carrier whereby the carrier provides only administrative services and the benefits are self insured. As a result, most employees of large organizations in the State of Maryland may not be covered for IVF.

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Finally, the State of Maryland's mandate to provide insurance coverage for IVF does not apply to its Medicaid program. Medicaid beneficiaries in Maryland are not covered for IVF.

The current rate charged by Blue Cross/Blue Shield in Maryland averages $1.06/household/month, and they anticipate that 75-80 percent of IVF expense will be reimbursed by the plan.

The State of Delaware is the most recent state to have a statewide program instituted by its Blue Cross/Blue Shield Association in response to a nearly successful attempt to have coverage mandated by the state. Effective January 1, 1987 employees of the State of Delaware will be covered for IVF and employees of midsize firms (300-500 employees) will be offered coverage as a rider (25). Delaware Blue Cross/Blue Shield anticipates extending coverage to individual contracts and small employer groups (50 or less) on April 1, 1987, although this is not yet definite. Large employers will have the option to purchase IVF coverage as their contracts are renewed throughout the year.

Delaware Blue Cross/Blue Shield will not require patients to undergo a minimum waiting period, although all other means must be tried by the patient with the exception of tubal surgery. The actuaries anticipate that some of the IVF costs will be offset by a reduction in the use of tubal surgery. While there is no restriction on the nymber of cycles that a person may attempt or on the cost per cycle, a lifetime maximum of $25,000 will be paid.

The Delaware Blue Cross/Blue Shield actuaries estimate that 90-95 percent of costs per cycle will be reimbursed by the insurance plan. The cost of insurance will be $.60/person/month.

The Cost of Insurance

As described above, the extra cost of IVF coverage has been estimated by actuaries at Blue Cross/Blue Shield to range from $1.06/household/month in

Maryland to $.75/person/month in Massachusetts. It is important to recognize that these are short term estimates. They have not been developed using estimates and projections of the incidence and prevalence of infertility or of an estimate of the likely demand for IVF. Instead they are based on the number of IVF services currently available and upon the assumption that every one of the currently available services will be used.

For example, actuaries for Maryland Blue Cross/Blue Shield arrived at their estimate of $1.06/household/month as follows. They surveyed the IVF clinics in and near the State of Maryland and found that the potential treatment capacity for these clinics in 1985 was 800 women per year, and that the average cost per patient would be $12,800 based on three treatment cycles per patient with varying degress of success. The total cost for all 800 women treated in or near Maryland would therefore be about $10,240,000; it was assumed that Blue Cross/Blue Shield of Maryland would be responsible for about half the amount, or $5,120,000.

The actuaries further assumed that capacity would grow by 33 percent in 1986, so that the estimated total cost to them in 1986 would be 1.33 x $5,120,000, or about $7,000,000. Distributing this sum over the 550,000 households that would be insured for this coverage yielded the rate of $1.06/household/month (35).

Where the demand for services is unknown and the supply of services is well known, and where the demand for services is thought to greatly exceed supply, near term estimates based upon supply alone are reasonable and quite accurate. The estimation described above was made by Maryland Blue Cross/Blue Shield actuaries in June of 1985. As of December 1, 1986 about 300 patients have applied for reimbursements of IVF expenses. Given the lags both in starting the program and in reporting by patients, it appears that their estimate of patient utilization was quite accurate. Unknown at this point is whether their estimate of the number of treatments per patient or the cost per treatment has been observed. Finally, as is only prudent, they have built into their rates a margin of error of at least 20 percent. They estimate

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that, after deductibles and coinsurance, they will only reimburse about 80 percent of charges.

Estimates of long-term or equilibrium costs of IVF coverage will have to be based on experience with the need and demand for services, and especially the effect insurance will have on such demand. This will require a close look at the incidence of infertility, especially the kind for which IVF is a preferred procedure; the cost structure of the industry that underlies the supply price; the availability and demand for substitute procedures; and the effect of insurance on the demand for IVF and non-IVF services.

Public Programs

At present we have not found any government program that covers IVF procedures. Furthermore, we have not been able to identify any government health facility, such as those operated by the Department of Defense of the Veterans Administration, that provides IVF services. However, just as the commercial insurance industry appears to be paying for some portion of the IVF expense even when its policies explicitly exclude IVF procedures, so too may government reimbursement programs such as CHAMPUS be unknowingly paying for these benefits.

Although the Federal Medicaid program does not place any restrictions on provision of IVF procedures by the states (26), we have not identified any state that offers IVF benefits. In order for the unwitting reimbursement of IVF charges by insurance carriers to occur, the patient must have sufficient resources to pay the clinic and await reimbursement. While this is a possibility for persons covered by private insurance and CHAMPUS, it is unlikely that Medicaid beneficiaries have such resources, so we do not think Medicaid programs are covering IVF benefits at all.

Federal Employee Health Benefits Program

The 2.8 million current civilian employees of the Federal government are covered by 380 different health plans nationwide (23). While some of the

smaller local health plans may provide IVF coverage, without intensive investigation it was not possible for the U.S. Government Office of the Actuary to identify them (23). Meanwhile, the large nationwide plans, such as Aetna, Blue Cross/Blue Shield, specifically exclude IVF, reversals of sterilization, and artificial insemination (23). Despite these specific exclusions, we think these plans are in fact providing some reimbursement for IVF components as described earlier. HMOs, on the other hand, are more able to control patient utilization of infertility services and are therefore less likely to reimburse IVF-related charges.

To estimate the cost of extending insurance coverage for IVF to Federal civilian employees, we proceed as follows. There are about 690,000 female employees of the Federal Government between the ages of 15 and 44, and 1,200,000 male employees aged 20 to 49 (we assume that males are married to females 5 years younger than themselves). (23) According to Mosher and Pratt (28), as shown in Exhibits 1-1 and 1-2, 52 percent of females between 15 and 44 are married. If this percentage holds for Federal employees as well, then about 360,000 female employees are married. If half the male Federal employees are married to women between 15 and 44, then there are 600,000 women between 15 and 44 married to male Federal employees. Altogether, that yields 960,000 women between 15 and 44 potentially eligible for Federal insurance coverage.

Mosher (see Exhibit 1-2) reported that 8.4 percent of married women between 15 and 44 were infertile. If this rate is also true for women covered by Federal plans, then 80,640 of these women would be infertile. We estimate in this report, based on our survey of IVF treatment centers, that 14,000 patients will have received IVF treatment in 1986. This represents about .625 percent of the female infertile population. Applying this percentage to Federal female employees we get about 500 Federal IVF patients.

We estimate that the current cost for IVF treatment is about $4,525 per treatment cycle, with 1.6 treatment cycles per patient. Thus the current cost per patient is about $7,240. For the 500 women covered by FEHBP, the total cost of IVF coverage is estimated to be about $3.6 million.

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4. INFERTILE COUPLES

This chapter discusses the likely costs and procedures applicable to a specific type of infertile couple. We begin by creating a profile of infertile couples, using demographic data available from the National Survey of Family Growth. In section 4.2, we present data on the costs and effectiveness of common infertility procedures. In section 4.3, we turn to an examination of a stylized set of procedures for a specific type of infertility. Costs and results for each scenario described are presented. Finally, in section 4.4, we discuss the choice of reproductive services, from the point of view of an infertile couple considering various options for achieving parenthood.

4.1 PROFILE OF COUPLES SEEKING TREATMENT

In developing a profile of infertile persons seeking infertility treatment services, we focus on infertile married couples, and primarily on the female side of each couple. Although men and women may account for equal amounts of total infertility, they do not account for equal proportions of the costs spent on infertility. Because there are relatively few diagnostic and treatment services for men compared to those available for women, a much greater percentage of infertility expenditures are spent on women than on men.

An examination of a sample of 1,106 infertile currently married women (based on a combination of the 1976 and 1982 National Surveys of Family Growth) showed a number of characteristics of infertile women (or more accurately, women who were part of an infertile couple -- the source of the infertility was not determined in the survey), compared to fecund women (18). These characteristics are presented in detail in Exhibit 4-1, which shows that:

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EXHIBIT 4-1

CHARACTERISTICS OF INFERTILE WOMEN

	Fecund	Infertile			Significance[a]
		All	Primary	Secondary	
Sample n	5,855	1,106	299	807	—
Weighted N(000's)	15,891	2,604	791	1,813	
Percent					
White	90.1	84.2	89.5	81.9	S,S
Black	7.5	12.9	6.9	15.5	S,S
More than High School	18.3	26.9	33.7	24.0	S,S
300% of poverty or higher	49.0	56.7	71.2	50.0	S,S
Woman's occupation					
Never worked	7.3	9.6	6.0	11.3	NS,S
Professional, technical, managerial	31.2	25.2	32.7	21.8	S,S
Husband's occupation					
Professional, technical, managerial	39.7	30.7	34.2	29.2	S,NS
Farm, craft, labor	47.9	55.8	52.2	57.4	S,NS
Mean[c]					
Age	29.3	33.4	31.5	34.2	
Years since first married	8.7	13.2	10.0	14.6	
Age at menarche	13.4	13.9	13.5	14.1	
Age at first intercourse[b]	18.9	19.1	19.8	18.8	
Months infertile[b]	—	67	68	67	

[a]The outcome of the significance test for each comparison (fecund vs. infertile, primary vs. secondary) is noted as follows:

S = Significant at .05 level

NS = Not Significant

[b]Data only available for women from NSFG, Cycle III. Therefore, sampling errors are larger.

[c]Standard errors to test means for significance were not available.

Source: Hirsch, M.B. and Mosher, W.D. Forthcoming in Fertility and Sterility, (see ref. 18). Based on 1976 and 1982 National Surveys of Family Growth.

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- Infertile women are generally older, with a mean age of 33.4, compared to 29.3 for fecund currently married women.

- Infertile women had been married longer (13.2 years) than their fecund counterparts (8.7 years).

- The proportion of blacks was higher among infertile women (13 percent) than among fecund women (7.5 percent).

- Infertile couples were generally less well educated and less likely to be in professional, technical, and managerial occupations than fecund couples, but they were more likely to have higher incomes (perhaps because of their older age).

- While virtually all fecund women (97.5 percent) had used at least one contraceptive method, only 65 percent of infertile women had done so.

- Infertile women were more likely to have been treated, and hospitalized, for pelvic inflammatory disease (PID) than fecund women.

Further analysis of this same sample revealed significant differences among four categories of currently married infertile women: those with primary vs. secondary infertility and those who had sought infertility services vs. those who had not. The characteristics of each of these groups are shown in Exhibit 4-2. Highlights include:

- One out of every two women with primary infertility was likely to have sought infertility services; only one out of 4 or 5 women with secondary infertility was likely to have sought services.

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EXHIBIT 4-2

CHARACTERISTICS OF INFERTILE WOMEN BY TYPE OF INFERTILITY AND HISTORY OF SEEKING SERVICES

	Primary		Secondary		Significance[a]
	Ever Sought Services	Never Sought Services	Ever Sought Services	Never Sought Services	
Sample n[b]	131	161	146	655	
Weighted N(000's)	399	280	404	1,397	
Percent					
White	88.3	90.6	90.1	79.8	NS,S
Black	4.3	8.9	9.9	16.9	NS,NS
More than High School	38.9	28.6	36.7	20.5	NS,S
300% of poverty or higher	71.1	72.0	68.8	44.5	NS,S
Woman's occupation					
Never worked	5.2	7.0	1.8	14.0	NS,S
Professional, technical, managerial	37.9	28.2	25.4	20.9	NS,NS
Husband's occupation					
Professional, technical, managerial	36.5	30.3	32.8	28.3	NS,NS
Farm, craft, labor	51.3	54.6	45.2	60.7	NS,S
Percent					
Married 10+ years	33.1	48.3	56.3	69.5	S,S
Treated for PID[c]	8.2	20.3	23.2	14.7	S,S
Hospitalized for PID[c]	3.1	4.3	12.0	1.3	NS,NS
Want a baby	88.2	51.5	79.0	39.3	S,S
Has 1 or more births	—	—	73.4	94.6	—,S
Mean[d]					
Age	29.3	32.7	32.4	34.7	
Years since first married	8.9	10.6	11.2	15.5	
Age at menarche	12.9	14.1	12.7	14.5	
Age at first intercourse[c]	19.1	21.1	18.9	18.7	
Months infertile[c]	66	71	61	69	

a/, b/, c/ See footnotes to Exhibit 4-1.

Source: Hirsch, M.B. and Mosher, W.D. Forthcoming in Fertility and Sterility, (see ref. 18). Based on 1976 and 1982 National Surveys of Family Growth.

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- Significant differences exist among the four groups in the percentage that want a baby, with a high of 88 percent for women with primary infertility seeking infertility services, to only 39 percent of women with secondary infertility who have never sought services but who want a baby.

- 1.4 million representing 54.9 percent of infertile women want a baby.

- Only 47.4 percent of infertile women who want a baby, or 671,000 women, ever sought infertility services.

In summary, users of infertility services differ in demographic characteristics from non-users of infertility services, and this difference is heightened for women with secondary infertility (18).

4.2 COSTS AND EFFECTIVENESS OF INFERTILITY SERVICES

This section discusses the cost and effectiveness of commonly sought infertility services.

Costs

Cost estimates for the more common infertility diagnostic and treatment services are shown in Exhibit 4-3. The cost data are based primarily on the charges reported by IVF clinics surveyed for this study. The charges reported by IVF centers may or may not reflect typical charges for procedures commonly provided by individual gynecologists and urologists who are not infertility specialists. Other data sources, generally in the same range, are also noted on Exhibit 4-3.

Figures reported are generally on a per test or per procedure basis, for the first in a series, where a series is applicable. For example, one form of

EXHIBIT 4-3

ESTIMATED COSTS OF INFERTILITY SERVICES

Diagnostic Services	Median Survey Cost a/	Range	Other Estimates
Patient History and Full Physical	$120	$50 - 415	$60 b/
Investigation of Infections	$ 40	$18 - 138	
Sonography (per exam)	$100	$40 - 186	
Hormone Tests (per test)	$ 40	$25 - 85	
Pelvic exam	$ 40	$18 - 75	$40 c/
Cervical Mucus			
- Postcoital Test	$ 40	$25 - 100	$25 b/
- Cervical mucus sperm penetration test	$ 40	$25 - 200	
Hysterosalpingogram	$150	$50 - 1500	$100-300 c/ $150 b/
Endometrial biopsy	$ 85	$50 - 350	$100-300 c/ $100 b/
Hysteroscopy	$400	$130 - 1100	
Laparoscopy	$800	$400 - 2500	$650-900 c, d/
Semen analysis	$ 45	$15 - 108	$25-70 c/ $15 b/
Sperm antibody test	$ 75	$35 - 300	$300 c/
Hamster test	$275	$35 - 390	$300 c/

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EXHIBIT 4-3

ESTIMATED COSTS OF INFERTILITY SERVICES
(continued)

Treatment Services	Median Survey Cost a/	Survey Range of Costs	Other Estimates
Infertility Counseling	$ 75 e/	$ 38 - 135	
Medical Treatment: f/			
Clomid	$ 30 per month	$ 16 - 75	$20/month b/; c/
Pergonal	$ 28 per ampule	$ 24 - 38	$40, 42 b/, c/
	$550 per month	$200 - 1500	$420-$504 c/
HCG	$ 20 per 5000 unit	$10-45	
Danazol	$160 per month	$120 - 200	$120 g/ $135 b/
Parlodel	$ 90 per Rx	$ 30 - 450	
Tubal reversals	$2500 h/	$1300 - 5000	
Reversal of vasectomies	$2000 h/	$1000 - 2500	
Tubal surgery for PID	$2000 h/	$ 750 - 3800	$3000-6000 c/
Repair of varicocele	N/A	N/A	$2000-2500 c/
Laser laparoscopy	$1200	$ 485 - 3000	
Ablation of endometriosis	$1200	$ 400 - 5000	
In vitro fertilization	$4525 i/	$ 775 - 6200	$4000-6000 c/
- Replacement of frozen embryo	$ 500	$ 220 - 1800	
Gamete intrafallopian transfer (GIFT)	$3500	$2500 - 6000	

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EXHIBIT 4-3

ESTIMATED COSTS OF INFERTILITY SERVICES
(continued)

Treatment Services	Median Survey Cost a/	Survey Range of Costs	Other Estimates
Artifical insemination			
Husband's sperm			$35-90 c/
- intracervical	$ 53	$ 30 - 105	
- intrauterine, washed sperm	$ 85	$ 40 - 200	
Donor sperm			$35-90 c/, $25 b/
- fresh	$ 80	$ 35 - 150	
- frozen	$100	$ 40 - 350	
- donor fee			$50-100 c/
Embryo Transfer	-	-	$6000-10000 c/

Notes:

a/ Median costs reported by up to 30 IVF centers in a November 1986 survey conducted for the Office of Technology Assessment.

b/ Cooper, G. See ref. 10.

c/ Harris, D. See ref. 16.

d/ Hospital laparoscopy runs between $1650 and $1900 (c/); $1500 b/.

e/ Counseling charges are often included in charges for full history and physical.

f/ Drug charges only; excludes physician charges.

g/ Bellina, J.H. and Wilson, J., see ref. 4.

h/ Physician fees only; excludes hospital charges. Cooper estimates $3500 for all surgical procedures.

i/ Overall mean is $4124. For non-profits (n=17), median is $5000; mean is $4661. For 14 for-profit IVF clinics, median charge is $4000; mean is $3472.

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artificial insemination is reported at a median cost of $53. Typically, the $53 would reflect the initial artificial insemination; subsequent attempts (up to, say, 3 times per month for 6 months) might be lower in cost. Similarly, only the cost per hormone test is given, although a battery of tests is usually done. Examples of actual costs to patients for a given protocol are provided in the scenarios developed in the next section.

In interpreting the cost data in Exhibit 4-3, it is important to recognize that infertility treatment today includes an ever-widening array of tests, techniques, and approaches, on which the consensus and experience of the medical community with regard to proper use and resulting success are far from universal. Although there are about 20 to 30 procedures commonly used by most infertility specialists, differences exist in methods of application, timing, and experience. These differences are reflected in both costs and pregnancy rates. Thus, on some of the procedures, a wide range of costs is reported. To reduce the problem of outliers, medians were used rather than means, to report survey data.

No significant differences were noted in costs reported per procedure for IVF centers of different size and organization status (i.e., profit vs. non-profit), except in one case. IVF charges for non-profit IVF centers were approximately $1000 higher than IVF charges reported by for-profit IVF centers. This result may be an artifact of the sample reporting, or it may reflect the relatively more difficult cases that are treated by larger, longer-established non-profit IVF centers.

Effectiveness

Exhibit 4-4 provides data on the effectiveness of selected treatment procedures, as reported by the survey respondents. Not all survey respondents reported results for each procedure; some did not report numbers of both patients and procedures handled.

Interpreting effectiveness data in the field of infertility treatment is a hazardous activity at best. First, and most basically, it is often

difficult to determine what particular infertility service may have been responsible for a pregnancy. Various studies report that 21 to 62 percent of pregnancies of treated and untreated infertile couples appeared to be independent of treatment (8). An indepth follow-up study of 1,145 infertile couples found that 41 percent of treated couples had pregnancies, while 35 percent of untreated couples had pregnancies (8). On the level of anecdotal evidence, one IVF clinic informed us that 5 women became pregnant while on the waiting list for IVF. When a number of infertility approaches have been used over a relatively short period, it becomes virtually impossible to isolate the procedure that worked, if indeed any of the procedures was responsible.

On a more practical level, there are difficulties in using most effectiveness measures. One measure is numbers of babies, but that measure may include multiple births, which do not reflect, in a sense, the desired outcome of a baby for each couple seeking a baby. In addition, numbers of babies may reflect complicating factors of difficulties of carrying a fetus to term, which are not strictly relevant to infertility.

Another measure commonly used is numbers of pregnancies, but unfortunately no standard definition of a pregnancy exists. A pregnancy may be defined as clinical, pre-clinical, chemical, viable, or live birth. Some programs report pregnancy rates per patient, per treatment cycle, per laparoscopy, per transfer, etc. (33) These difficulties are relevant to interpreting the data in Exhibit 4-4 as well.

Neither babies nor pregnancies represents a full measure of effectiveness of infertility treatment. The object of infertility treatment is a safe pregnancy resulting in a healthy baby. To the extent that certain infertility services result in increased health risks, either to the carrier or to the baby, these risks diminish the "effectiveness" of the procedure. IVF pregnancies, for example, are about four times as likely to result in an ectopic pregnancy as normal conception (24). Other risks include the daily intake of hormones, anesthesia during egg retrieval, stress to the uterus, spontaneous abortion, and multiple pregnancies.

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EXHIBIT 4-4

EFFECTIVENESS DATA a/

Treatment	Number of Pregnancies	No. Patients/ Procedures	Survey Preg. Rate	Other Preg. Rates (Ref)
Clomid	358	1252 patients (8 clinics)	29%	35-65% (16)
Pergonal	373	724 patients (8 clinics)	52%	45-63% (16)
Laser Laparoscopy	188	388 patients (7 clinics)	48%	
Ablation of Endometriosis	116	311 patients (8 clinics)	37%	
Tubal (PID) Surgery	92	336 patients (10 clinics)	27%	
In Vitro Fertilization	283	1637 patients 1960 procedures (17 clinics)	17% 14%	23-30% (15)
GIFT	72	365 patients (15 clinics)	20%	
Artificial Insemination (Husband)				80% in 6 months (4)
intracervical:	234	900 procedures (7 clinics)	26%	
intrauterine, washed:	219	2651 procedures (10 clinics)	8%	
Artificial Insemination (Donor)				
fresh	106	463 procedures (5 clinics)	23%	
frozen	87	603 procedures (7 clinics)	14%	

a/ Survey of IVF Clinics for OTA.

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Finally, there are difficulties on a center-by-center basis in interpreting success rates. Some IVF clinics are research centers; others offer only IVF, in a standard, undeviating, almost factory-line approach. IVF clinics associated with university medical schools and hospitals tend to receive the "hardest" cases and claim that their success rates would be higher still if they had a regular batch of patients. Overall, however, it is worth noting that technologies and experience take substantial time to diffuse industry-wide. Thus, although the "best" pregnancy rates for IVF are between 23 and 30 percent, the IVF clinics reporting in our survey averaged about 15 percent. The effects of specialization can also be seen in the survey results, for example, in the area of artificial insemination. AI is usually done by primary care physicians, resulting in success rates of 70 to 80 percent after 6 months (4, 11); the IVF clinics responding generally did not do great numbers of artificial inseminations, and their success rates averaged under 30 percent.

4.3 INFERTILITY TREATMENT SCENARIOS

In treating infertility, the more tailored the protocol is to the patient, the more likely the chances of success. For example, some specialists will treat endometriosis with surgery, with danazol, or with both; the choice of therapy, the length of time, and the dosages of drugs prescribed will depend on the woman's history and reactions. Countless patient-specific decisions may be made over the course of treatment; the results of each test and the success of each treatment indicate the next steps to be undertaken. Because of the varieties of sources and types of infertility, it is often difficult to determine whether standard treatment protocols exist, how much each one costs, and what their effectiveness is expected to be.

In addition, as with any medical arena with new advances, infertility specialists disagree as to the proper course of action in many cases. For example, some physicians will seek to determine in an initial workup whether a

woman has mechanical difficulties (such as blocked tubes or endometriosis), if not fully, then at least partially through the relatively simple means of an endometrial biopsy. This may be done even if the physician is aware of ovulatory problems (4). Other physicians will wait until ovulatory problems are cleared up even before determining the status of the tubes (5).

Finally, there are trade-offs to be made in cost, convenience, and surgical invasiveness. Most infertility workups do not routinely include a sperm penetration (hamster) test because of its $300 price tag and the relative infrequency of its importance. Nevertheless, there are always situations in which hindsight indicates that the test would have been appropriate and would have saved thousands of dollars of needless costs.

More often, there are cost savings to be gained by batching procedures, but not all of the costs might be necessary. For example, if a hysteroscopy, hysterosalpingogram, and laparoscopy are all performed together at the same time, the cost to the patient will likely be lower than if the hysterosalpingogram is done earlier on in an outpatient setting. Nevertheless, an earlier hysterosalpingogram may indicate no need to proceed with surgical diagnostics. Practices vary across specialists.

In order to examine the typical costs and procedures faced by an infertile couple, we have developed a series of prototypical scenarios (5, 17) that reflect the course of diagnosis and treatment of common infertility problems.

The scenarios proceed from simple procedures to more complex techniques, as outlined below. A detailed description of the assumptions used in each scenario, the number and types of procedures involved, and the costs, is presented in Exhibit 4-5.

Stage 1 Scenario -- couple presents for infertility. Full patient histories and physicals are performed; routine tests are done to check hormone levels and sperm quantity. Counseling may be offered

EXHIBIT 4-5

SCENARIOS

Infertility Service		Cost
Stage I Scenario -- Oligomenorrhea		
Diagnostics		
Patient History & Physical	$120 x 2	$ 240
Hormone Tests	$40 per test, battery run 3x in one month	$ 450
Pelvic Exam		$ 40
Semen Analysis		$ 45
Counseling		$ 75
	Total:	$ 850
Fertility Drug Treatment		
- Clomid		
Drug costs	5 days per month	$ 30
Blood tests	$40 x 3	$ 120
Ultrasound		$ 100
Physician visits	$40 x 2	80
		$ 330
	x 4 months	$1330
- Pergonal (one month)		
Drug costs, 5-10 days	$28 per ampule x 3 per day x 7 days	$ 550
Blood test run each day		$ 350
Ultrasound		$ 250
HCG		$ 20
Physician visits	$40 x 7	$ 280
		$1450
	Total	$2780
	Total, Stage I Scenario (6 - 9 months)	$3630

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EXHIBIT 4-5

SCENARIOS
(continued)

Infertility Service	Cost
Stage II Scenario	
Investigation of Infections	$ 40
Sonography	$ 100
Cervical Mucus	$ 80
Endometrial Biopsy	$ 85
Hysterosalpingogram	$ 150
Hysteroscopy	$ 400
Laparoscopy (Outpatient), including laser	$1200
Total, Stage II Scenario: (1 year)	$2055
Stage III Scenario	
Tubal Surgery (for PID)	
- Physician costs	$2000
- Hospital charges (anesthesia, operating room, hospital stay)	$1500
Laparoscopy	$ 800
Fertility drug treatment (See Stage I Scenario)	$2780
Total, Stage III Scenario: (18 months)	$7080

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EXHIBIT 4-5

SCENARIOS
(continued)

Infertility Service	Cost
Stage IV Scenario -- In Vitro Fertilization	
History and Physical, Counseling	$ 150
Drugs (Chemical Stimulation) - Clomid - Pergonal - HCG	$ 500
Ultrasound assessment of follicular growth	$ 500
Hormone blood tests	$ 425
Laparoscopy - Physician fees - Anesthesia - Operating Room	$1500
Embryology + Embryo Transfer - Laboratory - Physician	$1100
Hospital Room	$ 250
Follow-up, Routine tests	$ 125
	$4525
x 1.6 cycles:	
Total, Stage IV Scenario	$7200

Sources:

- See Exhibit 3-4 for costs of individual procedures.
- Scenarios developed with the aid of Drs. M. Bustillo (5) and F. Haseltine (17).
- Additional information on IVF component costs provided by three clinics in Connecticut, Maryland, and Ohio.

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to determine whether behavioral changes may be helpful (using, for example, new monoclonal antibody ovulation kits), and to inform the couple of options and prognoses.

We assume, for purposes of the scenario, that the problem is oligomenorrhea, a problem found in about 20 percent of infertile women and that is roughly applicable to women suffering ovulatory problems in general. The treatment prescribed in this stylized version of infertility services is the use of fertility drugs, first with clomiphene (Clomid), then (assuming for purposes of the scenario that it is ineffective) with menotropins (Pergonal).

Stage I diagnosis and treatment is estimated to require about 6 to 9 months to complete, yielding a pregnancy rate of about 30 percent. Thus, if 100 infertile women were to begin this course of treatment, we could expect 30 pregnancies at the end of Stage I. Total costs of Stage I for the couple are $3,620.

Stage II Scenario -- Complete Infertility Evaluation for Idiopathic Infertility. This scenario includes the full range of diagnostic tests for non-ovulatory causes of infertility, including investigation of infections, hysteroscopy, cervical mucus tests, etc. Some of the tests may have therapeutic value as well, and thus represent both diagnostic and treatment services. This is especially the case for laparoscopy; where feasible and necessary, laser laparoscopy can be performed at the same time as a diagnostic laparoscopy is done.

Stage II is likely to require about 1 year to complete, although for many women less time is required for a diagnosis. We estimate that Stage II would have a 30 percent success rate as well, and would cost about $2055. If the 70 couples who did not conceive after Stage I continued on to Stage II, then at the end of Stage II, out of the original 100 infertile women, we would see a total of 51

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(i.e., 30 + .3 x 70) pregnancies, after 18 to 21 months. The total costs of diagnosis from both Stages I and II are $2,905 (in 1986 dollars), which represents a mid-range estimate for a full infertility work-up (elsewhere estimated at $2,500-3,000 in 1984 dollars) (4, 16).

Stage III Scenario -- Tubal Surgery. The assumption in the Stage III Scenario is that the Stage II evaluation indicates blocked or damaged tubes. In Stage III, then, tubal surgery is performed on the woman to repair or open blocked or damaged tubes. In the absence of pregnancy following surgery, another laparoscopy may be done and fertility drug treatment may be started again.

Stage III is estimated to last about 18 months (before laparoscopy is done again), and to result in a 30 percent pregnancy rate. If the 49 couples who had not conceived after Stage II had all proceeded to Stage III, then about 15 would have become pregnant, bringing our total of pregnancies to 66. Total costs of the Stage III scenario are estimated at $7,070. Total costs for all three scenarios are $12,745.

Stage IV Scenario -- In Vitro Fertilitization. When pregnancy does not result even after tubal surgery, IVF may be considered. Only 1 out of 2 women is likely to be suited to IVF, however (17). If half of the remaining 34 couples undertake IVF and assuming a pregnancy rate of 25 percent for IVF, we should see an additional 4 pregnancies from the 17 couples. Total costs of Stage IV, assuming an average of 1.6 IVF cycles per couple, are estimated at $7,200. This estimate assumes retrieval of eggs is done by laparoscopy rather than with ultrasound, and that embryos are not frozen. Total costs for couples undergoing all four stages is $19,945.

All four scenarios thus yield a total of 70 pregnancies out of 100 original infertile women. With a 25 percent miscarriage rate, the number of babies resulting from these scenarios would be about 50.

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Since female infertility accounts for perhaps 40 percent of couple infertility, the scenarios above (which only account for female infertility) would yield 28 pregnancies (.70 x 40) out of 100 couples. Assuming that another 40 percent of couples are treated for male infertility with artificial insemination, which has perhaps a 60 percent pregnancy rate, we arrive at about 50 pregnancies (28 + .6 x 40) for the total 100 couples.

In sum, although these scenarios are a stylized version of the individualized treatment offered to actual patients, they represent a good deal of the procedures commonly used in infertility treatment. Exhibit 4-6 summarizes the scenarios, associated investments of cost and time, and resulting expected pregnancy rates.

Significant changes even in these stylized scenarios can be expected over the next several years as new developments and advances occur. Some of these developments are foreseeable, some are already being applied in a few centers but have not yet taken hold industry-wide. Embryo freezing, for example, allows IVF to be tried a second, and possible third, time without requiring chemical stimulation and laparoscopy. As embryo freezing develops and becomes more successful, the costs of subsequent cycles of IVF could drop by close to half. In addition, ultrasound is beginning to be used to retrieve eggs rather than laparoscopy, potentially cutting costs by an additional 30 percent. The diffusion of new technology will take time, however. For example, IVF centers that have invested in developing skills and purchasing equipment used in laparoscopic surgery will not necessarily dispense with that procedure in favor of ultrasound retrieval of eggs.

The most significant change to come may be the frequency with which tubal surgery is bypassed in favor of IVF or GIFT, or a similar type of technology. At the present time, IVF is considered a last resort, to be employed only after tubal surgery has been performed with unsuccessful results. There are, however, growing indications that IVF is starting to be considered earlier on in the process, thus, in effect, collapsing our Stages III and IV into a

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EXHIBIT 4-6

SUMMARY OF SCENARIOS

Scenario	Time	Cost	Preg. Rate	No. of Pregnancies
100 couples begin	after 12 months unsuccessful trying			
Stage I -- Simple Diagnosis and Treatment of Oligomenorrhea	6-9 months	$3630	30%	30
70 couples continue				
Stage II -- Complete Infertility Evaluation	12 months	$2055	30%	21
49 couples continue				
Stage III -- Tubal Surgery	18 months	$7080	30%	15
Half of remaining couples (17) are suited to continue with IVF				
Stage IV -- IVF	6 months	$7200	25%	4
30 couples seek adoptions, surrogacy, or give up				
	4.5 years	$19,955	70%	70

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single stage. And, at least at one clinic already, when diagnostic laparoscopies are performed, egg retrieval is also done; the eggs are then frozen, in the event that IVF is needed later. This approach further condenses both the cost of infertility treatment and the time involved, which is often of critical importance to couples where the woman is nearing the close of her childbearing years.

4.4 CHOICES OF REPRODUCTIVE SERVICES

A couple proceeding through the scenarios outlined in the previous section does not proceed automatically through each of the four stages. Even at this stylized level of analysis, one must consider the dynamic nature of the process: at each stage in the scenarios, some couples are successful in achieving pregnancy, others are unsuccessful and continue on. Still others are unsuccessful and drop out, whether for reasons of cost and affordability, or because of the strain on relationships and careers, or because of advancing age, or because other options such as adoption or surrogate motherhood become more attractive, or for other reasons. As the couple proceeds through these stages of treatment, the chances of pregnancy recede, while the costs escalate.

To see how the numbers work out in our four scenarios, Exhibit 4-7 shows the average cost per pregnancy and expected pregnancy rate at the start of each stage. These numbers are based on those shown in Exhibit 4-6.

Couples entering Stage I face a 70 percent chance of pregnancy at an expected cost of $9,760. The average cost of each pregnancy is $13,945. These numbers are derived as follows: Out of 100 couples beginning treatment in Stage I at a cost of $3630, 30 couples are assumed to be successful. The remaining 70 continue on to Stage II, paying $2055, as a result of which 21 couples will be successful, and so on. In total, 100 couples pay $3630, 70 couples pay $2055, 49 couples pay $7080, and 17 pay $7200, for a total cost to the 100 couples of $976,170. Thus, the expected cost per couple is $9761. Since 70 babies are produced, the average cost per baby is $13,945.

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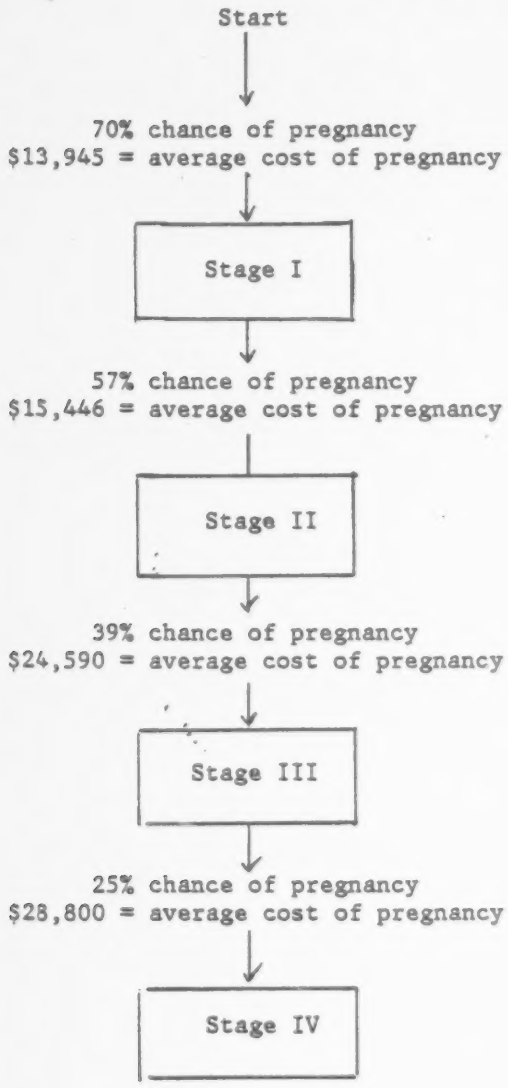
EXHIBIT 4-7

PROSPECTIVE SUCCESS RATES AND AVERAGE COSTS OF PREGNANCY



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This same calculation can be done at the beginning of each stage. Following Stage I, a couple may successfully conceive, or may contemplate a new set of choices. At this point, the chances of success are 57 percent and the average cost of pregnancy has now risen to $15,446. Similarly, at the approach to Stage III, the unsuccessful couple faces an expected success rate of 39 percent while the average cost of a pregnancy in Stage III rises to $24,590. Finally, in facing the decision whether to proceed with in vitro fertilization, the couple faces a 25 percent success rate and each resulting baby would cost, on average $28,800.

To what extent are these costs affordable, both to infertile couples and to society? On an individual level, the intensive costs of the four scenarios would be beyond the reach of low-income couples, and would represent a sizable investment for middle-income couples. Exhibit 4-8 provides the basis for an assessment of the affordability of each stage/scenario for the approximately 50,000 married couples in the U.S. For the approximately 16,000 married couples with before-tax incomes under $20,000, the costs of the four stages range from 6 to 40 percent of annual income. For another 16-17,000 married couples with before-tax incomes ranging from $20,000 to $35,000, infertility expenditures would represent between 2 and 15 percent of annual income. Finally, for the remaining 17,000 high income married couples with income over $35,000, costs represent between 1 and 8 percent of annual income. Alternative assumptions about the levels of income and insurance coverage of typical infertile couples would alter the results; however, the general trend of the analysis in Exhibit 4-8 is instructive.

From the standpoint of society, the question is sometimes asked whether we can afford certain benefits of medical technology. Are the costs of pregnancies using the current range of infertility treatment services out of line with what society is willing to pay? An analysis by Cooper (9) shows that costs of pregnancies resulting from infertility treatments are roughly in line with average costs of adoption ($3-10,000) and surrogacy ($20-45,000) (6, 9).

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EXHIBIT 4-8

AFFORDABILITY ANALYSIS FOR INSURED COUPLES

Scenario	Percent of Annual Household Income		
	Low-Income	Middle-Income	High-Income
Stage I: Diagnosis + Fertility Drug Treatment - Total Cost: $3630 - Cost to Couple: $1089	11%	4%	2%
Stage II: Complete Evaluation - Total Cost: $2055 - Cost to Couple: $617	6%	2%	1%
Stage III: Tubal Surgery - Total Cost: $7080 - Cost to Couple: $2124	21%	8%	4%
Stage IV: In Vitro Fertilization - Total Cost: $7200 - Cost to Couple: $4032	40%	15%	8%

Assumptions:

-- Income Profiles of Infertile Married Couples:

Low income group	Average income: $10,000.	Range: $0-19,999
Middle income group	Average income: $27,500.	Range: $20-34,999
High income group	Average income: $50,000.	Range: $35,000 plus

-- Insurance coverage:

- Assume all couples have health insurance coverage.
- Assume two-thirds to three-quarters of non-IVF infertility expenditures are reimbursed, i.e., costs to couples = 70% of total costs.
- Assume 66% of IVF costs are covered, at rate of 66% (i.e. 44% of IVF charges are covered by insurance).

* * DO NOT QUOTE OR CITE * *

To analyze these comparisons in more detail, the scenarios developed here can be taken a step further and used to examine the wider choices faced by an infertile couple in seeking to achieve parenthood. In Exhibit 4-9, we transform the scenarios into a broader decision process, which represents pictorially the options confronting an infertile couple at each stage of the process. In addition to the scenarios of infertility diagnosis and treatment, other options are represented as well, including adoption, surrogate motherhood, and non-treatment.

Choosing among options, at any given point in the process, depends on a couple's assessment of the costs of each option, the effectiveness of each option in producing a baby, the uncertainties and risks attached to each option, and the "desirability" of the baby each option might produce (e.g., in terms of its biological identity, genetic health, etc.), as well as other, personal decision factors unique to different couples. For example, at the start of the quest, a couple may face a choice (highly simplified here) of:

A: A 70 percent chance of a biologically related baby at the end of 5 years, at a cost of $13,900.

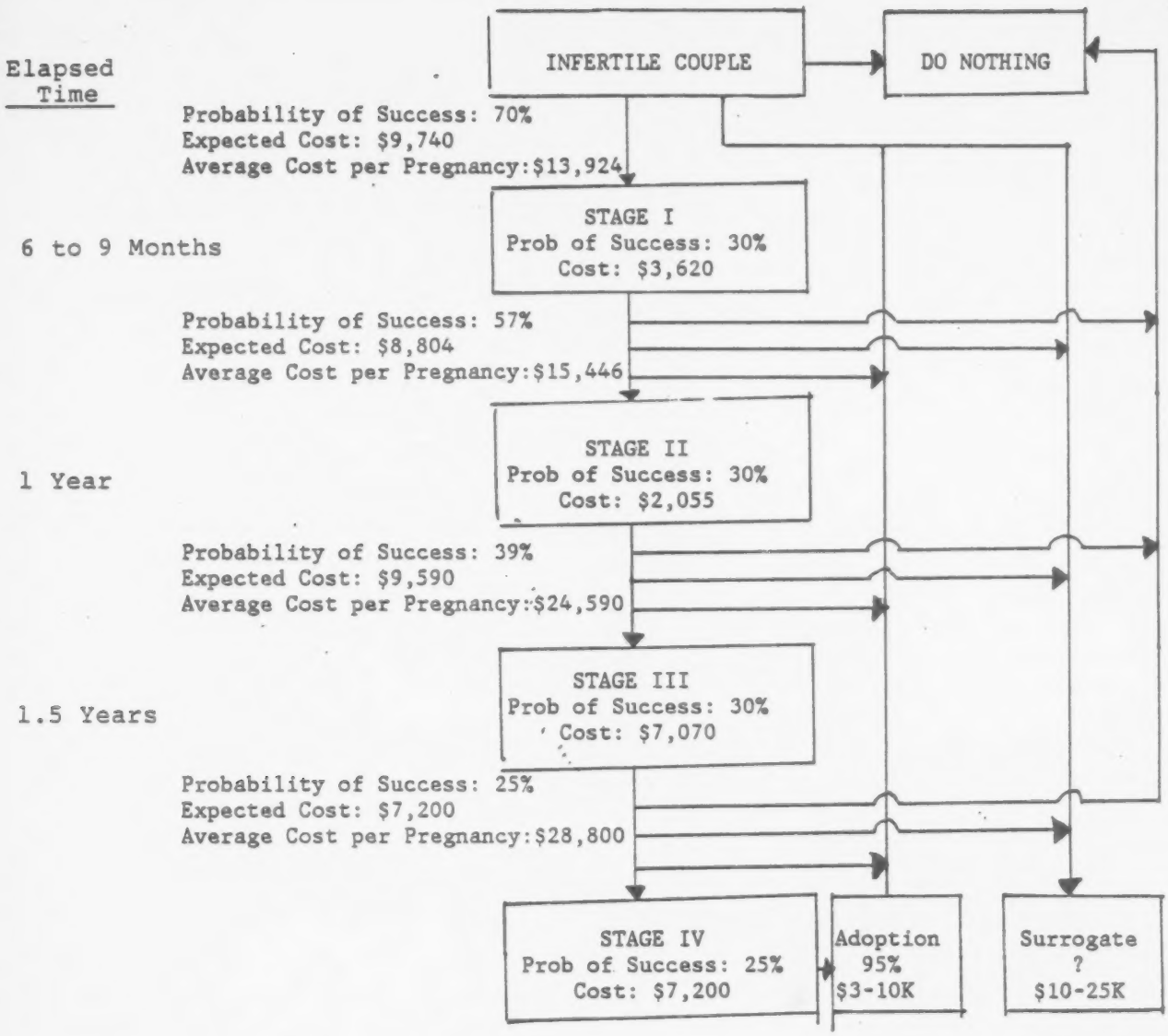
OR

B: A 95 percent chance of adopting an unrelated child (age 1 year) at the end of 4.5 years, with an outlay of $10,000.

To the extent that the information necessary to fill in Exhibit 4-9 is available, a rich analysis of the decision process encountered by infertile couples is made possible. Such a decision tree can help to answer questions such as: what is the most cost-effective means for a couple in their early 30s to achieve parenthood in the next three years? What would be the effects of an increase in the pregnancy rate of IVF to 50 percent on the choice of reproductive services? Although this analysis is only sketched in at a conceptual level for this report, it represents a useful future area of investigation.

* * DO NOT QUOTE OR CITE * *

EXHIBIT 4-9



* * DO NOT QUOTE OR CITE * *

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APPENDIX

INTERNATIONAL CLASSIFICATION OF DISEASE CODES RELATED TO INFERTILITY

INFERTILITY RELATED DISEASES

5

1)
ICD-9 NUMBER: 039.2
NAME OF DISEASE: Actinomycotic infections-Abdominal
PERCENT TREATED FOR INFERTILITY: 0%

2)
ICD-9 NUMBER: 072.0
NAME OF DISEASE: Mumps-Orchitis
PERCENT TREATED FOR INFERTILITY: 0%

3)
ICD-9 NUMBER: 098.1
NAME OF DISEASE: Gonococcal salpingitis, acute
PERCENT TREATED FOR INFERTILITY: 0%

4)
ICD-9 NUMBER: 098.3
NAME OF DISEASE: Gonococcal salpingitis, chronic
PERCENT TREATED FOR INFERTILITY: 25-75%

5)
ICD-9 NUMBER: 218.0
NAME OF DISEASE: Submucous leiomyoma of uterus
PERCENT TREATED FOR INFERTILITY: 20-50%

6)
ICD-9 NUMBER: 220.0
NAME OF DISEASE: Benign neoplasm of ovary
PERCENT TREATED FOR INFERTILITY: 10-25%

7)
ICD-9 NUMBER: 221.0
NAME OF DISEASE: Benign neoplasm of fallopian tube and uterine ligaments
PERCENT TREATED FOR INFERTILITY: 0%

8)
ICD-9 NUMBER: 222.0
NAME OF DISEASE: Benign neoplasm of testis
PERCENT TREATED FOR INFERTILITY: 0%

INFERTILITY RELATED DISEASES Cont.

9)
ICD-9 NUMBER: 226.0
NAME OF DISEASE: Benign neoplasm of thyroid glands
PERCENT TREATED FOR INFERTILITY: 0%

10)
ICD-9 NUMBER: 227.0
NAME OF DISEASE: Benign neoplasm of adrenal glands
PERCENT TREATED FOR INFERTILITY: 0%

11)
ICD-9 NUMBER: 227.3
NAME OF DISEASE: Benign neoplasm of pituitary gland and craniopharyngeal duct
PERCENT TREATED FOR INFERTILITY: 0%

12)
ICD-9 NUMBER: 236.0
NAME OF DISEASE: Neoplasm of uncertain behavior of genitourinary organs-Uterus
PERCENT TREATED FOR INFERTILITY: 0%

13)
ICD-9 NUMBER: 236.1
NAME OF DISEASE: Neoplasm of uncertain behavior of genitourinary organs-Placenta
PERCENT TREATED FOR INFERTILITY: 0%

14)
ICD-9 NUMBER: 236.2
NAME OF DISEASE: Neoplasm of uncertain behavior of genitourinary organs-Ovary
PERCENT TREATED FOR INFERTILITY: 0%

15)
ICD-9 NUMBER: 236.4
NAME OF DISEASE: Neoplasm of uncertain behavior of genitourinary organs-Testis
PERCENT TREATED FOR INFERTILITY: 0%

16)
ICD-9 NUMBER: 237.0
NAME OF DISEASE: Neoplasm of uncertain behavior of endocrine glands-Pituitary gl
ands & craniopharyngeal duct
PERCENT TREATED FOR INFERTILITY: 0%

INFERTILITY RELATED DISEASES Cont.

17)
ICD-9 NUMBER: 253.7
NAME OF DISEASE: Iatrogenic pituitary disorders
PERCENT TREATED FOR INFERTILITY: 0%

18)
ICD-9 NUMBER: 253.8
NAME OF DISEASE: Other disorders of the pituitary & otherdiencephalohypophyseal origin
PERCENT TREATED FOR INFERTILITY: 10-25%

19)
ICD-9 NUMBER: 255.0
NAME OF DISEASE: Disorders of adrenal glands-Cushing's syndrome
PERCENT TREATED FOR INFERTILITY: 0%

20)
ICD-9 NUMBER: 255.2
NAME OF DISEASE: Disorders of adrenal glands-Adrenogenital disorders
PERCENT TREATED FOR INFERTILITY: 0-10%

21)
ICD-9 NUMBER: 255.3
NAME OF DISEASE: Disorders of adrenal glands-Other corticoadrenal overactivity
PERCENT TREATED FOR INFERTILITY: 0-25%

22)
ICD-9 NUMBER: 255.4
NAME OF DISEASE: Disorders of adrenal glands-Corticoadrenal insufficiency
PERCENT TREATED FOR INFERTILITY: 0%

23)
ICD-9 NUMBER: 256.0
NAME OF DISEASE: Ovarian dysfunction-Hyperestrogenism
PERCENT TREATED FOR INFERTILITY: 0%

24)
ICD-9 NUMBER: 256.1
NAME OF DISEASE: Ovarian dysfunction-Other ovarian hyperfunction
PERCENT TREATED FOR INFERTILITY: 0%

INFERTILITY RELATED DISEASES Cont.

25)
ICD-9 NUMBER: 256.2
NAME OF DISEASE: Ovarian dysfunction-Postablative ovarian failure
PERCENT TREATED FOR INFERTILITY: 0-10%

26)
ICD-9 NUMBER: 256.3
NAME OF DISEASE: Ovarian dysfunction-Other ovarian failure
PERCENT TREATED FOR INFERTILITY: 0-10%

27)
ICD-9 NUMBER: 256.4
NAME OF DISEASE: Ovarian dysfunction-Polycystic ovaries
PERCENT TREATED FOR INFERTILITY: 25-85%

28)
ICD-9 NUMBER: 256.8
NAME OF DISEASE: Ovarian dysfunction-Other ovarian dysfunction
PERCENT TREATED FOR INFERTILITY: 0-10%

29)
ICD-9 NUMBER: 256.9
NAME OF DISEASE: Ovarian dysfunction-Unspecified ovarian dysfunction
PERCENT TREATED FOR INFERTILITY: 0%

30)
ICD-9 NUMBER: 257.0
NAME OF DISEASE: Testicular dysfunction-Testicular hyperfunction
PERCENT TREATED FOR INFERTILITY: 0%

31)
ICD-9 NUMBER: 257.1
NAME OF DISEASE: Testicular dysfunction-Postablative testicular hypofunction
PERCENT TREATED FOR INFERTILITY: 25-40%

32)
ICD-9 NUMBER: 257.2
NAME OF DISEASE: Testicular dysfunction-Other testicular hypofunction
PERCENT TREATED FOR INFERTILITY: 0%

INFERTILITY RELATED DISEASES Cont.

33)
ICD-9 NUMBER: 257.8
NAME OF DISEASE: Testicular dysfunction-Other testicular dusfunction
PERCENT TREATED FOR INFERTILITY: 0%

34)
ICD-9 NUMBER: 257.9
NAME OF DISEASE: Testicular dysfunction-Unspecified testicular dysfunction
PERCENT TREATED FOR INFERTILITY: 0%

35)
ICD-9 NUMBER: 258.0
NAME OF DISEASE: Polyglandular dysfunction-multiple endocrine adenomatosis
PERCENT TREATED FOR INFERTILITY: 0%

36)
ICD-9 NUMBER: 258.1
NAME OF DISEASE: Polyglandular dysfunction-Other combinations of endocrine dysfu
nction
PERCENT TREATED FOR INFERTILITY: 0%

37)
ICD-9 NUMBER: 258.8
NAME OF DISEASE: Polyglandular dysfunction-Other specified polyglandular dysfunc
tion
PERCENT TREATED FOR INFERTILITY: 0%

38)
ICD-9 NUMBER: 258.9
NAME OF DISEASE: Polyglandular dysfunction-Unspecified
PERCENT TREATED FOR INFERTILITY: 0%

39)
ICD-9 NUMBER: 259.0
NAME OF DISEASE: Delay in sexual development & puberty
PERCENT TREATED FOR INFERTILITY: 0-25%

40)
ICD-9 NUMBER: 259.1
NAME OF DISEASE: Precocious sexual development & puberty
PERCENT TREATED FOR INFERTILITY: 0%

INFERTILITY RELATED DISEASES Cont.

41)
ICD-9 NUMBER: 259.3
NAME OF DISEASE: Ectopic hormone secretion
PERCENT TREATED FOR INFERTILITY: 0%

42)
ICD-9 NUMBER: 260.0
NAME OF DISEASE: Kwashiorkor
PERCENT TREATED FOR INFERTILITY: 0%

43)
ICD-9 NUMBER: 261.0
NAME OF DISEASE: Nutritional marasmus
PERCENT TREATED FOR INFERTILITY: 0%

44)
ICD-9 NUMBER: 262.0
NAME OF DISEASE: Other severe protein-calorie malnutrition
PERCENT TREATED FOR INFERTILITY: 0%

45)
ICD-9 NUMBER: 582.0
NAME OF DISEASE: Chronic glomerulonephritis-With lesion of proliferative glomeru
lonephritis
PERCENT TREATED FOR INFERTILITY: 0%

46)
ICD-9 NUMBER: 582.1
NAME OF DISEASE: Chronic glomerulonephritis-With lesion of membranous glomerulo
ephritis
PERCENT TREATED FOR INFERTILITY: 0%

47)
ICD-9 NUMBER: 582.2
NAME OF DISEASE: Chronic glomerulonephritis-With lesion of membranoproliferative
glomerulonephritis
PERCENT TREATED FOR INFERTILITY: 0%

48)
ICD-9 NUMBER: 582.4
NAME OF DISEASE: Chronic glomerulonephritis-With lesion of rapidly progressive g
lomerulonephritis
PERCENT TREATED FOR INFERTILITY: 0%

INFERTILITY RELATED DISEASES Cont.

49)
ICD-9 NUMBER: 585.0
NAME OF DISEASE: Chronic renal failure
PERCENT TREATED FOR INFERTILITY: 0%

50)
ICD-9 NUMBER: 604.0
NAME OF DISEASE: Orchitis & epididymitis & epididymo-orchitis, with abscess
PERCENT TREATED FOR INFERTILITY: 0%

51)
ICD-9 NUMBER: 604.9
NAME OF DISEASE: Other orchitis & epididymitis & epididymo-orchitis, without mention of abscess
PERCENT TREATED FOR INFERTILITY: 10-25%

52)
ICD-9 NUMBER: 606.0
NAME OF DISEASE: Infertility male-Azoospermia
PERCENT TREATED FOR INFERTILITY: 90-100%

53)
ICD-9 NUMBER: 606.1
NAME OF DISEASE: Infertility male-Oligospermia
PERCENT TREATED FOR INFERTILITY: 100%

54)
ICD-9 NUMBER: 606.8
NAME OF DISEASE: Infertility male-Due to extratesticular causes
PERCENT TREATED FOR INFERTILITY: 100%

55)
ICD-9 NUMBER: 606.9
NAME OF DISEASE: Infertility male-Unspecified
PERCENT TREATED FOR INFERTILITY: 100%

56)
ICD-9 NUMBER: 607.8
NAME OF DISEASE: Other specified disorders of penis-Impotence of organic origin
PERCENT TREATED FOR INFERTILITY: 0-25%

INFERTILITY RELATED DISEASES Cont.

57)
ICD-9 NUMBER: 608.1
NAME OF DISEASE: Other disorders of male genital organs-Spermatocele
PERCENT TREATED FOR INFERTILITY: 0%

58)
ICD-9 NUMBER: 608.2
NAME OF DISEASE: Other disorders of male genital organs-Tortion of testis
PERCENT TREATED FOR INFERTILITY: 0%

59)
ICD-9 NUMBER: 608.3
NAME OF DISEASE: Other disorders of male genital organs-Atrophy of testis
PERCENT TREATED FOR INFERTILITY: 75-100%

60)
ICD-9 NUMBER: 614.0
NAME OF DISEASE: Acute salpingitis and oophritis
PERCENT TREATED FOR INFERTILITY: 0%

61)
ICD-9 NUMBER: 614.1
NAME OF DISEASE: Chronis salpingitis and oophritis
PERCENT TREATED FOR INFERTILITY: 75-85%

62)
ICD-9 NUMBER: 614.2
NAME OF DISEASE: Salpingitis and oophritis not specified as acute, subacute, or chronic
PERCENT TREATED FOR INFERTILITY: 75%

63)
ICD-9 NUMBER: 614.3
NAME OF DISEASE: Acute parametritis & pelvic cellulitis
PERCENT TREATED FOR INFERTILITY: 0%

64)
ICD-9 NUMBER: 614.4
NAME OF DISEASE: Chronic or unspecified parametritis & pelvic cellulitis
PERCENT TREATED FOR INFERTILITY: 0%

INFERTILITY RELATED DISEASES Cont.

65)
ICD-9 NUMBER: 614.6
NAME OF DISEASE: Pelvic peritoneal adhesions, female
PERCENT TREATED FOR INFERTILITY: 90-100%

66)
ICD-9 NUMBER: 615.0
NAME OF DISEASE: Inflammatory diseases of uterus, except cervix-Acute
PERCENT TREATED FOR INFERTILITY: 0%

67)
ICD-9 NUMBER: 615.1
NAME OF DISEASE: Inflammatory diseases of uterus, except cervix-Chronic
PERCENT TREATED FOR INFERTILITY: 0%

68)
ICD-9 NUMBER: 617.0
NAME OF DISEASE: Endometriosis of uterus
PERCENT TREATED FOR INFERTILITY: 0-10%

69)
ICD-9 NUMBER: 617.1
NAME OF DISEASE: Endometriosis of ovary
PERCENT TREATED FOR INFERTILITY: 90-95%

70)
ICD-9 NUMBER: 617.2
NAME OF DISEASE: Endometriosis of fallopian tube
PERCENT TREATED FOR INFERTILITY: 90-100%

71)
ICD-9 NUMBER: 617.3
NAME OF DISEASE: Endometriosis of pelvic peritoneum
PERCENT TREATED FOR INFERTILITY: 90-100%

72)
ICD-9 NUMBER: 617.4
NAME OF DISEASE: Endometriosis of rectovaginal septum and vagina
PERCENT TREATED FOR INFERTILITY: 90-100

INFERTILITY RELATED DISEASES Cont.

73)
ICD-9 NUMBER: 617.5
NAME OF DISEASE: Endometriosis of intestine
PERCENT TREATED FOR INFERTILITY: 90-100%

74)
ICD-9 NUMBER: 617.6
NAME OF DISEASE: Endometriosis in scar of skin
PERCENT TREATED FOR INFERTILITY: 90-100%

75)
ICD-9 NUMBER: 617.8
NAME OF DISEASE: Endometriosis of other specified sites
PERCENT TREATED FOR INFERTILITY: 90-100%

76)
ICD-9 NUMBER: 617.9
NAME OF DISEASE: Endometriosis, site unspecified
PERCENT TREATED FOR INFERTILITY: 90-100%

77)
ICD-9 NUMBER: 620.0
NAME OF DISEASE: Follicular cyst of ovary
PERCENT TREATED FOR INFERTILITY: 0%

78)
ICD-9 NUMBER: 620.1
NAME OF DISEASE: Corpus luteum cyst or hematoma
PERCENT TREATED FOR INFERTILITY: 0%

79)
ICD-9 NUMBER: 620.2
NAME OF DISEASE: Other and unspecified ovarian cyst
PERCENT TREATED FOR INFERTILITY: 0%

80)
ICD-9 NUMBER: 620.3
NAME OF DISEASE: Acquired atrophy of ovary and fallopian tube
PERCENT TREATED FOR INFERTILITY: 0%

INFERTILITY RELATED DISEASES Cont.

81)
ICD-9 NUMBER: 620.4
NAME OF DISEASE: Prolapse of hernia of ovary and fallopian tube
PERCENT TREATED FOR INFERTILITY: 0%

82)
ICD-9 NUMBER: 620.5
NAME OF DISEASE: Torsion of ovary, ovarian pedicle, or fallopian tube
PERCENT TREATED FOR INFERTILITY: 0%

83)
ICD-9 NUMBER: 620.8
NAME OF DISEASE: Other noninflammatory disorders of ovary, fallopian tube, & broad ligament
PERCENT TREATED FOR INFERTILITY: 0%

84)
ICD-9 NUMBER: 620.9
NAME OF DISEASE: Unspecified noninflammatory disorders of ovary, fallopian tube, & broad ligament
PERCENT TREATED FOR INFERTILITY: 0%

85)
ICD-9 NUMBER: 621.3
NAME OF DISEASE: Disorders of uterus-Endometrial cystic hyperplasia
PERCENT TREATED FOR INFERTILITY: 0-10%

86)
ICD-9 NUMBER: 621.5
NAME OF DISEASE: Disorders of uterus-Intrauterine synechiae
PERCENT TREATED FOR INFERTILITY: 90-95%

87)
ICD-9 NUMBER: 625.0
NAME OF DISEASE: Symptoms associated with female genital organs-Dyspareunia
PERCENT TREATED FOR INFERTILITY: 75-90%

88)
ICD-9 NUMBER: 625.1
NAME OF DISEASE: Symptoms associated with female genital organs-Vaginismus
PERCENT TREATED FOR INFERTILITY: 10-25%

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INFERTILITY RELATED DISEASES Cont.

89)
ICD-9 NUMBER: 626.0
NAME OF DISEASE: Absence of menstruation
PERCENT TREATED FOR INFERTILITY: 50-75%

90)
ICD-9 NUMBER: 626.1
NAME OF DISEASE: Scanty or infrequent menstruation
PERCENT TREATED FOR INFERTILITY: 75-90%

91)
ICD-9 NUMBER: 626.4
NAME OF DISEASE: Irregular menstrual cycle
PERCENT TREATED FOR INFERTILITY: 90-100%

92)
ICD-9 NUMBER: 626.6
NAME OF DISEASE: Metorrhagia
PERCENT TREATED FOR INFERTILITY: 10-25%

93)
ICD-9 NUMBER: 628.0
NAME OF DISEASE: Female infertility-Associated with anovulation
PERCENT TREATED FOR INFERTILITY: 100%

94)
ICD-9 NUMBER: 628.1
NAME OF DISEASE: Female infertility-Of pituitary-hypothalamic origin
PERCENT TREATED FOR INFERTILITY: 100%

95)
ICD-9 NUMBER: 628.2
NAME OF DISEASE: Female infertility-Of tubal origin
PERCENT TREATED FOR INFERTILITY: 100%

96)
ICD-9 NUMBER: 628.3
NAME OF DISEASE: Female infertility-Of uterine origin
PERCENT TREATED FOR INFERTILITY: 100%

17

INFERTILITY RELATED DISEASES Cont.

)7)
ICD-9 NUMBER: 628.4
NAME OF DISEASE: Female infertility-Of cervical or vaginal origin
PERCENT TREATED FOR INFERTILITY: 100%

)8)
ICD-9 NUMBER: 628.8
NAME OF DISEASE: Female infertility-Of other specified origin
PERCENT TREATED FOR INFERTILITY: 100%

)9)
ICD-9 NUMBER: 628.9
NAME OF DISEASE: Female infertility-Of unspecified origin
PERCENT TREATED FOR INFERTILITY: 100%

100)
ICD-9 NUMBER: 633.1
NAME OF DISEASE: Ectopic pregnancy-Tubal
PERCENT TREATED FOR INFERTILITY: 75-90%